Gas Journal

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Editorial Notes

Hydrogenation of Tar

We regard as of the utmost importance the work on the hydrogenation of various tars which is being carried out by the Fuel Research Board at East Greenwich. This piece of research is progressing rapidly and with a success which has far-reaching significance for the Gas Industry and the carbonizing industries generally. The object of this note is to emphasize this significance.

In his paper before the Midland Association of Gas Engineers and Managers ("JOURNAL" for Nov. 7, 1934) Dr. F. S. Sinnatt, Director of Fuel Research, expressed the considered opinion that the development of hydrogenation will have a great influence on the future of the carbonizing industries of this country. The process, he pointed out, is a means by which the whole of the tar produced by low-temperature carbonization, and a large proportion of the tar made at high temperatures—*e.g.*, the creosote—can be converted into light hydrocarbons. The yield obtained is such that the volume of motor spirit produced is equal to that of the low-temperature tar or the high-temperature tar distillate treated. The potentialities of this process obviously demand close study by the Gas Industry. Technically there is nothing to fear, while economically there is much to expect. At the present time it is not possible to arrive at decisions regarding the economic position, but we firmly believe that the Industry will make a grave mistake unless it investigates this aspect. We go so far as to say that the Industry has in this matter a golden opportunity and that if it fails to grasp it—well, others will not fail. Our Industry is a large producer of a raw material for motor spirit, and the present prices it obtains for this raw material must not be regarded as a criterion of its true worth.

There is, in fact, good reason to anticipate a higher return for gas-works tar or its distillates with consequent reflection in cheaper gas. Without delay this question should be investigated, and it would be all to the good if the larger gas undertakings collaborated in such an investigation. The success of the work to date on the hydrogenation of low-temperature tar and distillates from high-temperature tar may be gauged from the fact that a plant capable of treating 300 gallons a day is nearing completion at the Fuel Research Station. It will be a matter of weeks only before this plant is in operation. This size of unit has been selected as being sufficiently large to translate the results on to a commercial scale.

Although a proportion of high-temperature tar is not amenable to treatment, future information may well lead to the development of a suitable single-stage technique. We suggest that the difficulties of the hydrogenation process as applied to tar have been exaggerated. At any rate, when we turn to the recently published Report of the Fuel Research Board we find that it is a simple matter to obtain from creosote a 50% yield of spirit to 200° C. by one treatment, this yield being a percentage of the weight of the raw creosote treated. This can be increased by re-processing the higher boiling fraction. We may mention, too, that if a yield of 50% of motor spirit were obtained from the tar produced by the gas and coke oven undertakings of England and Wales it would be equivalent to about 150 million gallons of motor spirit. The question we would ask is: Does the Gas Industry intend to benefit from a process which appears likely to offer so much?

The Outlook for 1935

The carbonizing industries during recent years have had what is commonly known as a "thin time." For most of its long industrial history, the Gas Industry has advanced steadily. That advance may have been a direct consequence of the increase in population which during the period covered by the rise and development of gas making up to the present day has increased by some 400%. The declining birth-rate suggests that the population will soon become stationary or may even diminish, and that the gas consumption will fall again. Certainly many gas engineers appear to have sustained that peculiar injury to the morale known as "cold feet" during the past three or four years because the nice annual increase in make to which they had been accustomed has given place to a decrease. Even the Gas Industry cannot expect to escape unscathed the consequences of so severe a trade depression as that through which we have just passed.

Many have asked themselves a little anxiously whether competition and the population factor combined would not force the gas maker to be content with a lesser standard of prosperity than he has previously known. The

answer obtained by an analysis of statistics is encouraging. In 1920 the consumption of gas, in terms of gas sold by authorized undertakings, was 235,403 million c.ft., which by 1929 had reached a peak figure of 292,598 million c.ft.—an *increase* of over 24%. It is true that there has been a fairly steady decrease in gas sales since that time, amounting in the aggregate to a mere 2·2%—no bad achievement in the face of a depression that has closed down firms of high repute and has shaken many industries to their foundations. Even this decrease has now been arrested. No doubt the mild weather of the past few weeks will have its effect, but that is a mere accident of Nature which might happen any year and which does not affect the general conclusion that the Gas Industry is again advancing.

If any further proof of that statement is needed, the orders placed for the provision of new plant are sufficient to afford it. It is known that many orders are never published in the Press. Perhaps of all portions of the gas-making plant, that of gasholders best shows the trend of events. When a carbonizing plant wears out it must be replaced if the gas supply is to be maintained; but unless a gasholder becomes so leaky that it will not hold gas, or so dilapidated that it will not move up and down, it can usually be patched up. New gasholders are not required, other things being equal, unless the gas sales are advancing or are expected to advance. During the past year there has been a notable increase in the construction of gasholders as compared with the two previous years, an indication that the Gas Industry in general is increasing or that those in control have acquired a new confidence.

Confidence Justified

WHY should there be confidence in the future of gas? The answer is that the industrial history of gas has not been a record of steady progress. The early inventors and pioneers had a difficult task to put things on a workable basis. But it has been truly said that neglecting the work of the few pioneers, the Industry had up to 1884 meandered along without serious competition for 72 years under conditions which did little to promote efficiency. Profits were easily made as the public was at the mercy of the gas undertakings, and on the whole it would appear that this period did little to contribute to the good name of gas. It has been further suggested that it was only the coming of electricity that woke up the Gas Industry and that but for competition it would never have reached its present state of efficiency. That statement is undoubtedly true, for man is by nature a lazy animal and does not—the majority of him—do things except under the stimulus of external pressure. More and more intense is the competition becoming, and the reaction of the Gas Industry to it as shown by the events of 1934 will be to produce an even greater effort in 1935.

The prosperity of the country is so bound up with that of iron and steel that bye-product coking—which produces an essential constituent of the blast furnace charge—must be a fair reflex of the state of that industry. For years past the depression among those who use and those who build bye-product coke ovens has been profound. The seven, eight, or nine (the number varies from time to time) firms who specialize in the building of coke oven installations have been accustomed to receive about one order per year among them! The industry has been handicapped by obsolete installations that could not be replaced because trading conditions did not warrant any expenditure of capital upon them. The year 1934 has changed all that. No fewer than sixteen plants were ordered. Some of these are to replace existing obsolete plants, others are completely new installations. Some of these plants are erected at steel works, and others at collieries. One of the colliery plants is unique in that it is to be heated by producer gas, allowing the whole of the coke oven gas to be sold to neighbouring gas-works—for the most part, we believe, to Derby. This is a most interesting extension of the principle of coke oven gas supply to gas undertakings, for it is no longer the surplus gas that is to be sold, but the colliery is to become the gas-making plant for the town. The whole supply of Derby will not, of course, be taken from this one installation.

Another installation of no little significance is the first in this country to operate on the medium temperature process. By this process, described in the "JOURNAL" for Oct. 25, 1933, coke having all the desirable characteristics of the best low-temperature coke is claimed to be produced in the bye-product coke oven. The possible repercussions on gas coke of the provision of this highly combustible material in huge quantities at collieries must be taken into account by the Industry. There are several installations at work on the Continent producing some 1,000 tons of coke a day, but this is the first one to be put to work here.

Low-Temperature Carbonization

LOW-TEMPERATURE carbonization proper has had its usual year of ups and downs in 1934. Plants have failed, processes have disappeared (presumably), new projects have arisen, and new issues of shares have gone to the public. Some new plants will be built this year; the future will prove whether the optimism of their promoters is justified. One process alone stands out among others—the "Coalite." Low-Temperature Carbonisation, Ltd., has for the first time in the history of any low-temperature carbonization company paid a dividend. Some of the financial papers appear to have "spread themselves" upon hearing this news. It is surprising how readily financiers, who are generally reputed to be "hard-headed business men," fall into raptures upon the bare mention of the words "low-temperature carbonization." This dividend has been described as "A National Triumph" that has settled "once and for all the question as to whether the low-temperature carbonization of coal is a paying proposition." It has been further stated that "the successful utilization of the valuable oils and gases to be found in coal is a technical triumph of the first importance and of great economic and military moment to this country," and we further learn that "the future of the coal industry in this country depends very largely on the ability to turn coal into oil at economic rates. This can now be done, and opens up another major industry in the country—thanks to Low-Temperature Carbonisation, Ltd."

It is strange that the Gas Industry should be so neglected; the Industry which has been successfully treating coal economically and with maintenance of adequate dividends for a hundred years. The fact is, of course, that words of the calibre of those just quoted can only do harm to the cause of coal carbonization by their overstatement. Colonel Bristow and his staff are to be congratulated on a solid achievement which should not be dimmed by wild statements. These achievements were adequately described in a paper read during the year by Colonel Bristow before the Institution of Chemical Engineers. One of these achievements particularly stands out. Ten years ago the iron retorts used "grew" in ten months so much that an initial measurement of 9 ft. expanded on one side of the retort to 9 ft. 5 in. and on the other side to 9 ft. 11 in., the retort

becoming so warped that it could not be seen through from end to end; and that after only 10 months' working. To-day a combination of research into the metals that should be employed coupled with realization of the importance of uniform heating at temperatures below a critical figure has enabled the present retorts to operate for a period to be measured not in months but in years. It is not too much to say that without that discovery low-temperature carbonization would have been impossible as an economic proposition. Growth or warpage is still the stumbling block that nearly every other system employing metal retorts externally heated or retorts having moving parts has to overcome. The year starts with promise for low-temperature carbonization, though the Gas Industry may be pardoned for believing that low-temperature fuel is not so vitally important in view of the success of special coke-burning open grates and in view of the increasing use of gas for heating.

More—and Less—Electricity

A FEATURE of the newspaper press during the scanty happenings of Christmas week has been the annual report of the Electricity Commissioners for the year ended March 31 last, publication of which has been accompanied by headlines and comments indicative of a growing business. There was a record output; and there is no reason to believe that this progress will not continue. True it is that the period reviewed was noteworthy by reason of the fact that it witnessed the first definite and sustained improvement in the general industrial and trading conditions in Great Britain since the beginning of the acute depression in the later part of the financial year of 1929-30; but then we are all hoping that this improvement will go on expanding.

What, however, we have in mind at the moment is the regrettable fact that the announcement of these record figures of output of electrical units should have been accompanied by reports of the second failure within a week of current in the Worthing district. It was stated that hundreds of homes, hotels, boarding-houses, and public institutions suffered—and it was on Christmas Day. All parts of the town, and places as far away as Littlehampton, were affected. While in some cases the failure lasted only twenty minutes, the difficulty of locating the breakdown caused it to be two hours before other places had their lights restored. Candles were used at Worthing Hospital. And this was not all; for a day or two later both Hornsey Central Hospital and Hornsey Isolation Hospital were mentioned in the Press as having experienced a " black-out " lasting more than an hour, through a breakdown of electricity in North London. The newspaper reports added that gas lighting and candles were utilized at the Central Hospital. " No surgical work was in progress at the time." Assuming the facts to be correctly reported, this last sentence is the one gratifying feature about the affair. Time after time one comes across these unfortunate failures of lighting in hospitals, and too often there *is* surgical work in progress just when the light goes out. Surely it is time that something effectual was done to prevent occurrences of this character, which certainly seem to justify greater public outcry than has been encountered. If there is nothing effectual that can be done, and electricity must be confessedly unreliable, then an alternative method of lighting should always be available in places where sudden darkness must be assumed to be attended by serious danger to life. The fault may be a slight one, and the remedy easy; it is the result only that is of public concern. There are far, far too many of these " black-outs."

An Incentive to Effort

HAVING said this, we would urge gas men to give particular heed to the figures contained in the report of the Electricity Commissioners, which, if carefully studied, should prove an incentive to still further effort on the part of our own Industry. However enthusiastic the work that is at present being done on behalf of gas, we refuse to believe that " just a little bit more " is impossible, and let it be resolved for 1935 that this " last ounce " shall be put forth. During the twelve months to March 31 last, the total output of electricity by the authorized undertakers was 13·3% more than that of the previous year; and this increase is the largest ever recorded since the commencement of the issue of official statistics in 1920-21. The industry has been connecting new consumers at the rate of between 500,000 and 600,000 per annum. It is remarked in the report that particular features of recent years have been the rapid growth of the domestic load; the increasing extent to which authorized undertakers are providing facilities (either through hire or hire-purchase terms) for the wiring of domestic premises and for the installation of electrical apparatus therein; and the general adoption of two-part tariffs, whereby consumers are enabled to make use of the supply not only for lighting, but also for cooking, heating, water heating, refrigeration, and other domestic purposes, at a low average cost per unit.

Of course, we are fully aware of the perfectly valid arguments regarding the difference in age between the two industries, which gives the electricians a larger field to cultivate; but, when all is said and done, there is plenty in the above facts extracted from the report of the Electricity Commissioners to spur on gas men to greater efforts. Those connected with our Industry can ascertain by a study of this report something of what they are up against. Yet another point which, at the present juncture, may be of special value for the Gas Industry to note is a reference of the Commissioners to the question of charges and tariffs. They think there are far too many different kinds in force in the various areas of supply, and suggest a move towards greater uniformity in methods of charge.

Forthcoming Engagements

January.

3.—MIDLAND JUNIOR ASSOCIATION.—Meeting at Nottingham and paper by Mr. W. L. Howe.
8.—I.G.E. General Purposes Committee, 11.15 a.m.
8.—I.G.E. Education Committee, 4 p.m.
8.—N.G.C.—Central Executive Board Meeting, 2.30 p.m.
8.—FEDERATION OF GAS EMPLOYERS.—Meeting of Central Committee, at 28, Grosvenor Gardens, S.W. 1, 12 noon.
12.—SCOTTISH JUNIOR GAS ASSOCIATION.—Joint Meeting at Glasgow. Paper by Mr. Stephen Lacey.
14.—GAS COMPANIES' PROTECTION ASSOCIATION.—Meeting of Committee, 2.30 p.m.
16.—B.C.G.A.—Meeting of Executive Committee, 11 a.m.
16.—B.C.G.A.—Meeting of General Committee, 2.30 p.m.
17.—S.B.G.I.—Council Meeting, 2.30 p.m.
19.—YORKSHIRE JUNIOR ASSOCIATION.—Meeting at Sheffield. Paper by Dr. Fritz Gummert.
19.—WALES AND MONMOUTHSHIRE JUNIOR ASSOCIATION.—Meeting at Porthcawl. Paper by Mr. G. Thomas.
23.—B.C.G.A.—Manchester District Meeting, Manchester.
24.—B.C.G.A.—Yorkshire District Meeting, Leeds.
25.—B.C.G.A.—Northern District Meeting, Newcastle-on-Tyne.
25.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Meeting and paper by Mr. S. F. Dunkley.

Personal

In the New Year Honours List appears the name of Prof. C. V. Boys, A.R.S.M., LL.D., F.R.S., until Dec. 31 last a Gas Referee, who is now a Knight Bachelor.

* * *

Mr. Albert Hittinger, General Manager of the National Benzole Company, Ltd., has been appointed a Director of the Company. Mr. Hittinger has been associated with the Company since its inception in 1919, and became General Manager in 1925.

* * *

Mr. H. H. Brown, the Second Assistant Engineer to the Southampton Gas Light and Coke Company, has been promoted to the position of Assistant Engineer, to succeed the late Mr. E. Dunbar. Mr. Brown, who was trained at the Southampton Works, later spent some years as Technical Assistant at Ilford, before returning to Southampton in 1919. He is a double medallist in Gas Engineering, and besides being an Associate Member of the Institution of Gas Engineers, takes a keen interest in the work of the London and Southern District Junior Gas Association, being a member of the Council.

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The Accrington and District Gas Board on Dec. 20 reappointed Alderman John Barlow, J.P., the 80 years old veteran public leader, as Chairman.

* * *

Mr. John Wilson, Works Superintendent at the Newport (Mon.) Gas Company, has been recently appointed to a similar position at Keighley. Mr. Wilson received his early training at Halifax under Mr. W. B. McLusky.

* * *

Mr. Dennis S. Glover has severed his connection with Messrs. George Glover & Co., Ltd., after twelve years of service with that firm, and has joined the Sales Staff of Messrs. Metropolitan Gas Meters, Ltd., of Nottingham and London.

* * *

Mr. E. J. King, who has been in the service of Messrs. Robert Dempster & Sons, Ltd., of Elland, for a period extending over nearly 42 years, retired on Dec. 31. Mr. King has been a Director of the firm for over 30 years, and the Board has decided to retain his services as a Director. To mark his retirement, the Directors at a recent meeting presented to Mr. King a silver salver as a token of their esteem, and the staff also presented him with a "Compactom" wardrobe. Early in the New Year it is Mr. King's intention to take a three months' cruise on the "Arandora Star," sailing Jan. 26, visiting South Africa, East Indies, Singapore, &c. Mr. King's present address is Froome Field, Elland.

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After a service of over 53 years as Superintendent of the Fittings Department of the Wolverhampton Gas Company, Mr. Alfred Coombe has retired. Mr. Coombe, who was formerly with the Birmingham Gas Department, went to Wolverhampton in 1881, when the late Mr. John Annan was Engineer and Manager. At that date the number of fitters was six, and during his long period of office he has seen the staff increased to 100. At the last meeting of the Directors, the Chairman of the Company (Mr. A. B. Hanbury-Sparrow, J.P.) thanked Mr. Coombe for his long and valuable services and handed him a cheque on behalf of the Board. The staff of the Undertaking have also made a presentation to Mr. Coombe, and the employees in the Fittings Department have presented him with a silver cigarette box as a token of the high regard and esteem in which all held him.

Obituary

The death has taken place suddenly of Mr. F. J. Ballard, of Messrs. F. J. Ballard & Co., Ltd.

* * *

Mr. William Balsillie, who was the oldest Director of the St. Andrews Gas Company, died at St. Andrews on Dec. 22.

* * *

The death has occurred at Baildon, at the age of 74 years, of Mr. John William Rhodes, formerly Chief Cashier to the Shipley Gas Department, who had been a member of the staff for nearly 50 years when he retired in 1923.

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On Christmas Day at his Leven home the death occurred of Mr. William Williamson, formerly Manager at Oban and also at Forres. Mr. Williamson began his training with Leven Gas Company, and his first appointment was as Manager at Oban. He was appointed to a similar post in Leven in 1914 and retired two years ago.

* * *

His very many friends in the Gas Industry will learn with deep regret of the sad loss sustained by Mr. Alfred Harrison, late Editor of the "Journal," in the death, very suddenly, on Dec. 23, of his wife. Mrs. Harrison was seemingly in normal health to within two hours or so of her death which terminated with such tragic suddenness the family preparations for Mr. Harrison's first Christmas in retirement. To him, and to his daughters, the Industry will extend sincere sympathy.

* * *

On Dec. 22, at the age of 84, the death occurred, at 11, Kymberley Road, Harrow, of Mr. Sidney Evance Stevenson, who will be remembered by the older generation of gas engineers as having occupied the position of Engineer and Manager of gas undertakings at Exeter, Colchester, Montreal, Cape Town, Devonport, and York. Before his final retirement he joined his brother, Mr. E. Herbert Stevenson, Consulting Engineer, in Westminster. The funeral took place at Golders Green on Dec. 24.

Correspondence

Co-operation with the Manufacturer

Sir,—Mr. Dieterichs' description of how an Industrial Gas Centre functions is very interesting reading to us as suppliers of gas-fired equipment, and we are sure that to those interested in the production and distribution of gas it must be at least equally so. The kind way in which he stresses the importance of co-operation between Gas Undertakings and makers of gas appliances specially appeals to us.

The trouble and cost needed in breaking down the prejudice against the use of gas for a purpose to which it has not been used before is far greater than can be imagined by anyone who has not tried it. Without the sympathy and help of the gas concerns no one would risk a second try, but the co-operation of the Industrial Gas Centres, which we are experiencing, and are very grateful for, cannot fail to be encouraging and helpful.

The remarks of Mr. Stephen Lacey about under-selling were very suggestive, and we feel sure will be helpful. Unfortunately there are still gas concerns which, without realizing it, act in a way that handicaps the manufacturer of specialities badly in the following manner:

> They are so keen on pleasing their consumer that they offer to allow him a portion, or in some cases the whole, of their trade discount, thinking that the manufacturer is as well off being paid the same net amount as if the consumer had paid full price. They overlook the fact that the manufacturer has to do the selling in other districts in which the gas concern has no salesman to undertake the work, and that bakers to-day are closely federated and tell all their friends of any such saving as they can effect.
>
> In consequence of this our difficulties in securing orders and maintaining prices have been enormously increased. To avoid the first cost frightening off business in competition with cheaper appliances, our gross profits average a much smaller percentage than gas concerns tell us that they usually get as discount off other appliances.
>
> Again, the gas concerns running the service pipes, &c., through free of charge handicaps us, as in districts where they will not do so the consumers often consider that they are being treated unfairly.

Mr. J. C. Hosken's suggestion is one which we naturally welcome. We have had an uphill fight over a hundred miles away for over six months, trying for an order, calling repeatedly in the hope of securing it for gas. The first requirement was for over £1,000 worth of ovens with another order of about £1,500 to follow if the consumer was satisfied. The gas consumption of the former we estimate would have been at least 3 million c.ft. per annum.

The reduction offered by the local gas concern in consideration of that quantity was too small. Our cus-

tomer was thoroughly convinced that gas was the most suitable fuel for him, and would have placed his order if he could have obtained it at 6d. a therm. We heard less than a week ago that he has decided definitely against it, and we understand that he has placed his order for oil firing and intends to carry the whole scheme through with it.

The loss of a load like this frequently leads to many other firms, not merely in the same gas concern's area, installing apparatus employing competing fuel. All manufacturers of gas-fired furnaces, &c., who compete for orders all over the country, will no doubt confirm this fact. For instance, our best order in South Wales resulted from an installation in Yorkshire.

With regard to licences mentioned by Mr. Dieterichs in his reply, we realize that the best policy is to be "tied house" to no manufacturer, but to let the best appliance win on its merits. The way he suggests dealing with manufacturers' mistakes illustrates his own friendly attitude, the appreciation of which we are sure is shared by many other appliance makers as well as being gratefully acknowledged by

Yours, &c.,
COX & SON.

King's Road, Tyseley,
Birmingham, 11,
Dec. 20, 1934.

SIR,—The admirable paper by Mr. Dieterichs given to the Southern Association of Gas Engineers and Managers deserves intensive study by all connected with the invigorated Gas Industry. It should tend to waken the lethargic sections of the Industry to the fact that concentrated and concerted efforts are increasingly important.

Competitive industries are still prone to regard gas as a competitor steadily waning, a factor of great value. A fight is more easily won when your opponent underrates your capability.

As a bakery engineer I have experienced many actions on the part of gas companies' officials which are not incentives to mutual co-operation. A letter was sent to a certain gas company advising them we were installing a gas-consuming apparatus and suggesting it might be in their interest to examine the installation with a view to joint efforts in their area to obtain further sales. We were asked for prices and discounts. 10% was offered, but we were promptly informed that unless the discount was increased to 33⅓ the official concerned could not pass particulars to his department dealing with the industrial appliances. In other words, they were more interested in discounts than increasing gas sales. A very peculiar mentality.

A similar notification was sent to another company. They thanked us and viewed the installation. Once in the bakery the question of converting ovens to gas firing was dealt with. The gas company side-tracked us and dealt with the conversion themselves. This is certainly no incentive to keep local gas authorities posted with our activities.

Many similar examples could be quoted, but they form a striking contrast to my experience at Watson House and also with the South Metropolitan Gas Company at Old Kent Road. Regarding the latter, Mr. Dean Chandler and his department have rendered great assistance.

I am pleased to admit my indebtedness to Mr. Dieterichs and his Staff at Watson House, to whom I frequently submit my problems. Their expert knowledge is readily tendered. When I develop any apparatus details are submitted to them for helpful criticism, and when the construction is completed it is submitted to them for test.

Other manufacturers also consult Watson House for technical advice and assistance, and this tendency will increase as manufacturers realize that the Gas Industry is not a competitor, but has specialized centres with facilities to assist in the development of highly efficient industrial equipment.

Mr. Dieterichs' paper is a good omen. If the brains in the Gas Industry and establishments manufacturing gas equipment and appliances combine to serve the vast potential industrial field, the future prospect of all connected with the Gas Industry is excellent. The effort, however, must be sustained; it means assessing your competitors at the highest value at all times.

There is one point I would stress. If you have a prospect for industrial equipment, endeavour to close the transaction immediately. Do not be afraid to let the manufacturer get the order if he is able. Your routine may cause delay and permit the competitor getting the business. I have known many orders to be lost because the industrial representative wanted to get the order and objected to the manufacturer pulling off the business. The delay entailed resulted in a live competitor getting the order.

We may ultimately see experts in certain industries serving on the Committees with the experts of the Gas Industry.

Yours, &c.,
W. ELLERD-STYLES,
M.I.E.E., A.M.I.Mech.E.

Ceres House, 9-13, *Pentonville Road,*
London, N. 1,
Dec. 31, 1934.

Slogans on Motor Lorries

SIR,—We notice that in your issue dated Dec. 19 on your "News in Brief" page, you state that a certain gas meter company have carried out an original idea to advertise gas by having a gas slogan on their motors.

As a point of interest, we would like to mention that the idea of a gas slogan on motors is not original, as we have had signs of this description on our vans for the past twelve years. As a matter of fact, we were the first gas meter company to use daylight signs on our motors carrying slogans of the type you mention, and, in addition, every one of our lorries has in large type on the back, "Safety First—Use Gas."

Yours, &c.,
SAWER & PURVES.

Nelson Meter Works,
Miles Platting, Manchester,
Dec. 21, 1934.

News In Brief

A Price Reduction of 1s. per 1,000 c.ft. to 4s. has been made by the Lennoxtown Gaslight Company.

A Reconstruction Scheme is to be undertaken at the Kilsyth Corporation Gas-Works at a cost estimated to be in the region of £10,000.

The New Gasholder at Ardrossan is to be proceeded with and the offer of Robert Dempster & Sons, Ltd., has been accepted for that purpose.

It is Estimated that approximately 10,000 people visited the Birkenhead All-Gas House during the period it was open; it proved a splendid advertisement.

A Deputy District Superintendent is required by a 2,500 millions undertaking. The commencing salary offered is £450 to £550 per annum, according to experience.

About 50,000 Homes in southern Birmingham were affected at 9 o'clock on the evening of Dec. 30 as a result of a cable fault in the electric supply on the Stratford Road circuit. The districts affected were Solihull, Shirley, Warstock, Acocks Green, Hall Green, and Sparkhill.

An Exhibition of Gas Appliances, with cookery and other demonstrations, will be staged by Cumnock Gas Company, Ltd., in Cumnock Town Hall, from Jan. 8 to 11.

The Employees of the Newcastle-upon-Tyne and Gateshead Gas Company have raised, by weekly contributions during the past year, £904 in aid of medical charities.

A Distribution Superintendent is required by the Kilmarnock Gas Department at a salary of £250 per annum. Applicants must be between the ages of 25 and 35 years.

Stevenston Lighting.—The Stevenston District Council has agreed that for the next five years the streets shall be lighted by the Stevenston Gas Company. The County Council is to bring the existing installation up-to-date and erect 21 new lamps.

Hydrogenation Plant at Tyneside?—It is considered probable, states the *Yorkshire Post*, that during the new year a plant for the hydrogenation of coal will be established on Tyneside. Negotiations have not been concluded, but they are said to be well advanced.

Bottled Gas in Sweden.—Householders on the many islands and in the inaccessible country districts around Stockholm may now enjoy the advantages of gas for cooking and heating, since the Gas Undertaking is selling gas under pressure in cylinders. The cylinders have a capacity of 6,000 litres.

A Reduction in the Price of Gas has been decided upon by the Colne Corporation Gas Committee for domestic consumers, two-part tariff consumers, industrial users, mill lighting, schools, and public premises. The reduction will cost the Department £2,100 annually, of which about £1,300 will go to domestic consumers.

Gas for Country Houses in the Cambrai district of Northern France by means of gas under pressure in steel cylinders has recently been inaugurated. The gas is drawn from one of the coke works of the Anzin collieries, and at the compressor station at Cambrai provision is made for filling a dozen cylinders at a time.

"The Romance of a Lump of Coal" was the subject of a lecture recently by Mr. A. McDonald, B.Sc. (Engineer and Manager of the Motherwell Gas-Works), to the Craigneuk Belhaven Fraternal. Mr. McDonald dealt specially with the question of smoke abatement, and his subject was illustrated by lantern slides.

An Inspection of Coke Grates.—At the invitation of the Oldham Corporation Gas Department members of the Lees Council are to go on a local tour of inspection to see coke-burning grates in operation. The Oldham Commercial Gas Manager, Mr. E. Parry, asked the Council to consider the provision of such grates in its new houses.

An Interesting Lecture was recently delivered by Mr. J. P. Scott, Chemist to the Edinburgh Corporation Gas Department, on the "Manufacture of Edinburgh Town Gas" to a joint meeting of the Edinburgh and East of Scotland Sections of the Institute of Chemistry, the Society of Chemical Industry, and the Chemical Society.

West's Gas Improvement Company have received confirmation of a contract for an installation of Glover-West vertical retorts for the Southend-on-Sea station of the Gas Light and Coke Company. There will be 64 retorts of the 40-in. steaming type in the new unit, arranged in eight beds of eight, with waste-heat recovery and coal and coke handling plant, the whole being capable of a nominal daily production of 4,800,000 c.ft.

The Purchase of the Wilsden Gas Undertaking is now contemplated by the Bingley Urban District Council who were recently recommended by the Finance Committee to appropriate £10,000 from the Gas Department Reserve Fund, and to seek power to borrow £15,000. Wilsden was incorporated in Bingley some years ago, and negotiations for taking over the Gas Undertaking there have been proceeding for a considerable time.

The Automobile and Aeronautical Section of the German Association of Engineers of Berlin is making arrangements for the holding in the spring of next year of a reliability trial of motor vehicles, the engines of which are either operated by compressed or producer gas, in the one case stored in steel cylinders and in the other generated on the vehicle. The object of the tests is to show how far Germany can be rendered independent of imported fuel for motor vehicles.

William Coward & Co., Ltd., of 3, St. James's Square, S.W. 1, announce that they have received the appointment of London Agents to the Manly Gas Company, Ltd., of Manly, N.S.W. The Manly Gas Company is one of the most progressive in Australia, and supplies a district which bids fair to developing to a considerable extent in the future. The General Manager of the Company, Mr. A. H. Smedley, visited England last year, and was present at the Annual Meetings of the Institution of Gas Engineers.

New Gasholder at Carnoustie.

Inauguration Ceremony.

Carnoustie's new gasholder was brought into commission on Dec. 18, when the inauguration ceremony was performed by Councillor Peter Crerar, Gas Convener, who turned on the town's gas supply from the new holder.

In addition to local councillors and officials, gas engineers were present from neighbouring districts, and later they were entertained at tea.

At the gas-works, Councillor Crerar presided. They had met, he said, to introduce a new improvement. For some time past they had required a little more gas pressure and also more storage. To achieve this they had demolished two small holders and erected this new one in their place. They began to dismantle the old holders in March, to build the new one in June, and it was finished by November. They had had difficulties to face. They had to excavate 12 ft. to reach rock, on which they built concrete piers with a raft on top. In the piers there were 220 tons of ferro-concrete, re-inforced with 10 tons of steel.

Councillor Crerar presided at tea at the Station Hotel over a gathering which included Mrs. Crerar, Provost Ramsay, Bailie and Mrs. A. B. Easson, Mr. and Mrs. D. O. Young, Mr. and Mrs. J. M. Ireland, Mr. and Mrs. A. F. Anderson, Mr. W. Lindsay Burns (Managing Director of Messrs. Henry Balfour & Co., Leven) and Mrs. Burns, Mr. and Mrs. J. Wilson (Dundee), Mr. and Mrs. J. Smart (Monifieth), Mr. H. B. Skea (Forfar), Mr. and Mrs. R. L. Laing (Brechin), Mr. and Mrs. D. Morton (Arbroath), Mr. and Mrs. D. McIntyre (Montrose), and Mr. and Mrs. J. F. Black (Newport).

Mr. W. Lindsay Burns, speaking for the Contractors, said when they received the order he felt it was his duty to do something for Carnoustie in return. An order was lodged with the Anderson-Grice Company for an overhead travelling crane of 7½ tons capacity. This had given so much satisfaction that they had placed an order for another.

Mr. Burns presented a silver salver to Councillor Crerar and a silver fruit dish to Mr. J. M. Ireland as mementoes of the occasion.

Provost Ramsay proposed the toast of "Carnoustie Gas Undertaking," and Mr. Ireland, in replying, said that the gas-works were founded in 1855 and taken over from the private company by the Corporation in 1910. The quantity of gas produced in 1885 was 5 million c.ft., and this year the figure was 48 million c.ft.

Ex-Bailie Bell proposed "Neighbouring Gas Undertakings," to which Mr. John Wilson (Dundee) replied, and Councillor McKenzie replied on behalf of the ladies to the toast proposed by Bailie J. B. Cunningham.

The new holder weighs 1,750 tons, has a capacity of 100,000 c.ft. of gas, and the tank holds 355,000 gallons of water.

A Novel "Console" Radiator Display.

A GAS RADIATOR OF DISTINCTION
John Wright & Co.
GOOD NEWS this cold weather
See them at Yours
The "CONSOLE" Cabinet Gas Radiator
SEE THEM AT THE GAS SHOWROOMS

We reproduce above a recent John Wright display in the vestibule of Newspaper House, Birmingham, featuring "Console" cabinet radiators. The general colour scheme was orange, black, and gold, and forming the background was a giant reproduction of the "Birmingham Despatch" showing a "Console" advertisement. The display attracted a good deal of attention from a constant stream of people who visit the vestibule to see the day's news in photographs.

CHURCH LIGHTING BY GAS

The accompanying photographs show the interior of St. Mary's Church, Harlow, the lighting of which by gas has recently been completed by the Bishop's Stortford, Harlow, and Epping Gas and Electricity Company. The nave and transepts are lighted by twelve Sugg's "Streatham" lamps fixed to existing fittings, while the chancel is effectively floodlighted by "directive" three-light cluster burners with suitable reflectors, fixed behind the Rood Screen in such a way as to be invisible to the congregation. All lights are controlled by pneumatic switches in inconspicuous positions, and the complete effect gives a remarkably even illumination, which, though brilliant, is entirely free from glare.

Yorkshire Junior Gas Association.

Meeting in Sheffield.

Mr. Ralph Halkett, Junr., Assistant Manager of the Sheffield Gas Company, delivered his Presidential Address to the Yorkshire Junior Gas Association on Dec. 15. The members assembled at the Head Offices of the Company, where they inspected the unique control room in connection with the Gas Grid which the Sheffield Gas Company has established in conjunction with their supplies of crude gas from various coke oven plants in the South Yorkshire area. The party adjourned to the Grand Hotel for the meeting.

Mr. J. W. CARLTON (Shipley), Senior Vice-President of the Association, presided, and was supported by Mr. Ralph Halkett, Senr., General Manager and Secretary of the Company, and Mr. H. Chamberlain, Gas Engineer. Mr. C. S. Shapley, Engineer and General Manager to the Leeds Gas Department, was also present.

Mr. HALKETT, Senr., voicing a welcome to the visitors on behalf of the Directors and himself, said he retained pleasant recollections of his own membership of the Yorkshire Junior Association, and always took a keen interest in the affairs and activities of the Junior Associations. This occasion was particularly pleasant to him. He was proud of the honour the Association had done his son by electing him their President, and he hoped that what Mr. Halkett, Junr., was able to do for the Association during his year of office would add to its long career of usefulness for the Gas Industry generally.

Mr. Ralph Halkett, Junr., then delivered his Presidential Address, which will be found on later pages.

Following the meeting the visitors were entertained to a "hot pot" meal at the Grand Hotel, Mr. HALKETT, Senr., presiding.

Mr. CARLTON moved a vote of thanks to the Directors of the Sheffield Gas Company and Mr. Halkett for their hospitality, which was seconded by Mr. J. W. WOOD, M.Sc. (Leeds).

Mr. HALKETT, Senr., responding, said seniors in the Gas Industry had to realize that their own times were passing along and it was their duty to do anything they could to encourage and help the younger men coming along to fill their places in due course. They had had an outline of a big scheme which was perhaps as yet only partially developed. In tackling the problem the Sheffield Gas Company knew it was handling a great task and one which would bring them many difficulties. The difficulties had been overcome by the aid, he was glad to say, of the experience and ability of their staff. Sheffield's heyday of gas consumption, of course, was during the War, when the city was a great munitions centre. After the War, consumption fell away, but now they had climbed up again, and he believed the present year would prove to have beaten all previous records. Sheffield had, he believed, the oldest industrial gas department in the country. They had had an industrial gas department for 30 years or more. They had to have men in daily touch with users, advising them as to the best means of utilizing gas for their particular purposes. They had been fortunate in having men who had grown up in the industrial gas department and were able to give practical advice to users from their own actual experience of many years. They could not only advise, but could design furnaces and equipment, whether large or small, to meet the needs of any class of business.

Then they opened up their Research Department. This was developed on a substantial scale about three years ago. It had set out to make the industrial user gas-minded, and it was only when they had the technical and practical men together that they got industrialists fully to realize that gas as an industrial fuel was better than any other for their purposes. It took quite a couple of years to develop this side of the business on the lines indicated. It had developed now to such an extent that he was afraid they had now reached a stage at which there was not enough coke oven gas in South Yorkshire to meet the prospective requirements, and means would have to be found to get more gas. There was no doubt at all that the demand for coke oven gas by the Sheffield Gas Company had saved not only some coking plants but some collieries as well from financial difficulty during the long slump in the coal industry. He anticipated that in the near future more batteries of coke ovens would have to be installed in South Yorkshire, and there was no doubt that they would be a definite asset to the colliery companies who erected them.

South Midland Gas Corporation, Ltd.

Our attention has been called to the fact that, in the section of our Review of 1934 ("JOURNAL," Dec. 26) dealing with amalgamation and grouping of gas undertakings, no reference was made to the South Midland Gas Corporation, Ltd. For the sake of making our record as complete as possible, we would mention the operations of this Company (registered at the end of 1933) which took place in the year under review.

Before June 30 last the Corporation, which is in close association with the Oxford and District Gas Company, had obtained control of the Banbury Gas Light and Coke Company, the Witney Gas and Coke Company, Ltd., and the Eynsham Station of the British Gaslight Company.

ELECTRICAL VARIETY

By "Listener-in"

Wireless listeners were entertained the other evening to half-an-hour's electrical "variety" in the London Regional programme. "The National Network of Electrical Power" was introduced—or, at times, introduced itself—in dramatized form, parts of which were amusing and others a little silly; but both were doubtless calculated to convince the layman that, by using more and more electricity, he is doing a National service, and that these ugly pylons "stretching across hill and valley bring energy to all and new life to the countryside."

After a number of introductory remarks on the subject of electricity in general and the Grid in particular, we were enabled to eavesdrop on a conversation between, presumably, a district visitor and a housewife in a slum dwelling—the latter, singularly well-informed on the subject, bewailing her sad lot that she had "not yet got the electric." Judging also from her further complaints, the gas undertaking in her area must have been lamentably inactive. Her son, however, had evidently drawn her a Utopian picture of his home in a new block of council flats, which, with its electric stove, was "just like 'eaven." So much so, that the good woman might almost be tempted to mis-quote Macbeth in thinking—

"But that this stove
Might be the be-all and the end-all here
. . . We'd jump the life to come."

Following this heartrending portrayal of the terrible conditions under which slum-dwellers have to live without the amenities of all the latest electrical appliances, we listened-in to a broadcast of a local town council meeting, where a well-meaning but uninformed councillor moved a resolution that electricity be provided in every house in the town, in many of which, apparently, the only form of lighting was by rush torches. He was ably supported in his proposition by a local carpenter whose trade enabled him to give his fellow members first-hand information of the appalling conditions which prevailed. The resolution was only just saved from going through by the prompt intervention of the Chairman of the Electricity Committee, who pointed out that had it been possible his Committee would have proceeded on these lines even without such a resolution from the council (a most improper proceeding), but that their generating station was already working at full capacity, and until they were linked up with the Grid they were powerless to proceed.

At this stage the council, somewhat fogged, inquired, judge-like, "What is this Grid?" But the Chairman of the Electricity Committee did not feel competent to embark upon an explanation, and solicited the aid of the Electrical Engineer to enlighten the members.

"As the Grid develops," said the Engineer, "the price of electricity will tend to become about the same throughout the country; and the charging of widely differing prices in different areas will become unnecessary."

One can only express the hope that this will actually be the case; and, on the strength of this, the original proposer agreed to amend the wording of his resolution, which was then carried unanimously, and the meeting broke up with expressions of congratulations all round.

The Grid is Built.

Then we heard the orders for the building of the Grid. A stenographer, who must be the world's fastest shorthand writer, took down at the chief's dictation the requirements for enormous quantities of materials from all parts of the country, and, hey, presto! the Grid is in being. The great super generating stations throughout the kingdom were then introduced to us, and, speaking for themselves, told us what they are doing, in appropriate accents according to their particular situations. But it is time we looked into this Grid business closer; so we are treated to a trip above London and the home counties in an aeroplane, and, it being fortunately a clear day, the observer was enabled to see all the pylons stretching out from London across the country to the north and south. The observer expressed astonishment at not seeing these pylons crossing the city itself, and was informed that here the cables run underground.

"But why don't they put all the cables underground?" he asked, evidently objecting to the beauties of Nature being spoilt by these hideous lines across the countryside.

"Too expensive," was the laconic reply.

The pilot is a veritable mine of information on the subject of electricity; but even his enthusiasm cannot offset the increasing discomfort of his passenger, evidently unused to flying, who pleads, "What about turning back? It's damned cold up here."

We were then taken right into the heart of things, and introduced, through the good offices of a lady visitor who happened to be calling, to the Control Room of the Grid in London. "What a lovely room," exclaims the lady, "everything is so peaceful." The control panels round the walls somewhat incongruously remind her of the automatic ticket machines at an underground railway station. She inspects the indicator which shows that the Hastings generating station is functioning properly; a switch is obligingly closed for her at Brighton (we trust Brighton consumers were not inconvenienced) in order that she might see the result; while she evinces a really remarkable understanding of the intricacies of load curves and output diagrams.

"Why, you know all about our private lives from these charts," she says.

"Not *all*," replies her guide, modestly, "but we know what time you get up in the morning."

"Don't you sometimes get a machine breaking down?" she inquires innocently. Awkward question this, but the Control Room Superintendent remains outwardly calm.

"It is very seldom that the public knows anything about it," he replies guardedly—and, perhaps, a little untruthfully. And at that psychological moment the indicator showed that Station X had suddenly dropped load; and the visitor is conveniently treated to a real breakdown at first-hand. A telephone inquiry reveals that Station X had had to drop a set as a result of a fault, and the Control Room Superintendent shows that this really does not matter at all, a few curt orders to other stations to pick up the loss being all that is necessary. It is all so simple. So simple, in fact, that it makes one wonder why the public actually does know a great deal about it when the current so frequently fails in all parts of the country.

A weather report at this stage predicts a nasty disturbance approaching from (we believe) Iceland in the form of a fog, and we are given an insight into the provisions that have to be made to meet this emergency. For the fact that such vicissitudes of Nature do not rank as an emergency in the Gas Industry we thank our greatest advantage over electricity—namely, our storage. But the show is now over.

We hope that the Gas Industry will go one better.

Gas Exhibition at Pontypridd.

Several Well-Known Firms Co-operate.

For a period of five weeks the Pontypridd Urban District Council held a Gas Exhibition at Mill Street, Pontypridd, under the supervision of Mr. David Muir, Gas Engineer and Manager.

Messrs. Falk, Stadelmann, occupied one floor of the building for three weeks giving a display of their "Bakerloo" and "Newhome" cookers, "Silo-Matchless" fires, and lighting units. Miss Holland and Miss Curle gave cookery demonstrations and lectures for the firm. Messrs. Cannon Iron Foundries gave a display for two weeks of their cookers, fires, and radiators, with cookery demonstrations and lectures by a chef. Messrs. R. & A. Main, Radiators, Ltd., Parkinson Stove Company, General Gas Appliances, Vulcan Stove Company, W. H. Dean & Co., and Russell, Derby, also displayed their appliances.

The lighting of the exterior of the building was carried out by Parkinson's 10-light suspension lamps fitted with reflecting aprons.

Koppers Coke Oven Plant for Berlin.

The Berlin Municipal Gas-Works have recently placed an order with the firm of Koppers, Essen, for the erection of a coke oven installation at the Berlin-Lichtenberg Gas-Works. There have been Koppers ovens at this works for some years, but this installation is especially interesting, as, in giving this order, the Berlin Gas Undertaking has chosen the same system of ovens as that in use at the Beckton Works of the Gas Light and Coke Company.

The plant comprises 40 Koppers combination circulation

ovens heated by producer gas. The ovens are 33 ft. long, 10 ft. high, and 17½ in. in width, the size being selected to fit in with the older existing ovens. The battery will carbonize 438 tons of wet coal per 24 hours.

Self-sealing doors, iron upon iron, are provided, together with the usual up-to-date coal, coke, and oven equipment.

Showcase Advertising.

Our photograph is of a novel form of gas appliance advertising. It shows an attractive display of a recessed showcase installed by the Parkinson Stove Company, Ltd., in the Birmingham Hippodrome Foyer. Much public interest has been created by these displays.

Associated Gas and Water Undertakings, Ltd.

The First Ordinary General Meeting was held at 1, Brighton Road, Redhill, on Dec. 14.

Mr. W. Lees Stenning, M.B.E. (the Chairman), said:

The business for which this meeting has been called will take little of your time. It is held solely to conform with the Articles of Association; to elect a Director retiring by rotation; to elect auditors, and to fix their remuneration.

I should like, however, to take this—the first—opportunity to tell the shareholders something of the progress which has been made.

The Company was incorporated on Dec. 4, 1933, after prolonged study of the organization and methods adopted by such "holding" companies as then existed in the Gas Industry. It was felt that this great and important Industry would be usefully served by the organization of a company,

> Financially controlled by those within the Industry.
>
> Directed by those who had experience of the special problems confronting the administrators of provincial gas undertakings, and
>
> Organized in such a way that the controlled undertakings would participate in the profits of the Company which controlled them.

Associated Gas and Water Undertakings, Ltd., fully meets those ideals.

No financial house was interested in the promotion of the Company, nor in its subsequent development; all the Directors have had lifelong experience of the Industry in the provinces, and arrangements have been made whereby the controlled undertakings all share in the prosperity of the Company.

The Company's Interests.

We only commenced business on Feb. 7 last, but since that date we have acquired approximately 75·6% of the voting capital of the Horsham Gas Company, Ltd., 99% of the ordinary stock of the Edenbridge and District Gas Company, 98% of the shares of the Westerham Gas and Coke Company, Ltd., 94·3% of the voting capital of the Haslemere and District Gas Company, the whole of the issued capital of the Midhurst Gas Company, Ltd., the Kirton-in-Lindsey Gas Light and Coke Company, Ltd., and smaller holdings in the East Surrey Gas Company and the Petersfield and Selsey Gas Company.

In view of the manner in which our proposals have been received, we anticipate further extension of our activities at no distant date.

No accounts are before the meeting to-day, but I may say that our issued capital now amounts to £154,000 which has been expended chiefly in the acquisition of the companies to which I have referred, and to a minor degree in loans to those companies. We are satisfied that the prices paid for our holdings are to-day below the market value.

We have decided that our financial year shall end on March 31, the accounts being placed before the proprietors early in May each year. An interim dividend on the preference shares at the full rate was paid on Nov. 30.

The retiring Director (Mr. J. H. Donaldson) was re-elected and Messrs. Peat, Marwick, Mitchell, & Co. were appointed auditors to the Company for the period ending March 31, 1935.

Christmas Windows at Colchester

The above window displays were arranged during Christmas week by the Colchester Gas Company. One of these—that on the right—was a rather unusual display and attracted a great deal of attention. This consisted of an exhibition of 78 cakes made by the evening students taking cookery classes at the local Technical College. The notice at the back states that the cakes were baked in "New World" gas cookers. After studying this display for some time a lady entered the Showroom and told the attendant that she could not make cakes like that because she had an electric cooker, and she wished to know whether the Company's lady demonstrator would bake a Christmas cake for her in the Showrooms. The answer was that if she would hire or purchase a gas cooker she could make as many cakes as she liked.

The Marketing of Coke

by F. M. H. TAYLOR

Coke for Steam Raising

Mr. F. M. H. Taylor, Ph.D., M.Inst.Fuel, M.I.H.V.E., continues his series of articles dealing with specialized phases of the gas coke market, other contributions to which by the same Author have appeared in recent issues of the "JOURNAL."

The steam raising coke load is one of considerable importance to a gas undertaking because the supply in the majority of such installations is for factories or laundries where there is ample storage space, so that bulk deliveries can be made with reduced handling charges. Very often rail or barge sidings are available and coke may be sent direct from a depôt without re-handling, but most important of all there is nearly always an all-year-round consumption of coke, sometimes even more in the summer than in the winter, and the necessity for keeping large stocks at the works during the summer and autumn is thereby avoided.

Summer consumption in reality means some shillings a ton on the value of this type of coke business over and above, say, the central heating of flats and offices where deliveries are not easy, always by road, and the consumption is very high in the winter and correspondingly low in the summer. The steam raising load has one outstanding advantage over domestic coke trade—that a relatively small coke order staff can account for a considerable tonnage during the year, as the relative value of the coke to office charges sales and delivery costs is very much higher than with the domestic trade, where small house to house deliveries and high costs for the preparation of coke for the market absorb a large proportion of the revenue obtained from its sale.

Steam raising boilers fall into four main groups:

1. *Steam Central Heating Boilers.*—These operate under very low pressure—up to 2 or 3 lbs. per sq. in., and the boiler may be cast iron, or, if of steel, of low strength thin plate, and is not necessarily stayed. The method of operation, stoking, and control is otherwise exactly the same as for the hot water circulation central heating boiler, which has been described in a previous article in the "JOURNAL."

2. *Small Local Boilers.*—For catering purposes and for local steam supplies (usually up to 40 lbs. per sq. in. pressure) in factories where a steam main is not available or the demand is so intermittent as not to justify the cost of a steam main for a central service. The small load of up to 500 or even 1,000 lbs. per hour may probably be met by the installation of a gas fired boiler, the added convenien outweighing the cost advantages of coke.

3. *Power House Installations.*—The boiler of 20,000 lb per hour evaporation and over, fired by chain grates mechanical stokers, uses a fuel with which coke cann compete in price. These installations are typical of electr cal power houses, large chemical works, and factori generating their own power. Chain grate stokers, such are employed on large power plants, can utilize the low grades of coal of very small size and high ash content at price which is very low, even when allowance is made f its poor quality, owing to the difficulty hitherto exper enced in finding a market for it. Coke breeze is often us in those installations fired by chain grate stokers in co junction with coal, employing the sandwich system origi ally introduced by Mr. Nicol, of the London and Counti Coke Association. Coke breeze may be used on this ty of plant only by modifying the furnace brickwork so th the fuel bed is maintained at a high temperature at th front of the grate, and ignition of efficiently charged fu thereby assisted. When used in a furnace designed origi ally for small coal the coke breeze fails to ignite on entr into the furnace, and its satisfactory operation is prevente

4. *Steam Raising Boilers up to* 10,000 *lbs. per hou Evaporation.*—This is the plant on which the profitab steam raising load can be obtained for coke. The numb of such installations must run into many thousands, an in the past two years some 50 or 60 tests against Welsh Midland, and North Country steam coals have been carri out in the London area, representing conversions equiv lent to approximately 30,000 tons per annum. These te have been conducted in laundries, nurseries, public bath hospitals and other large institutions, and factories pr ducing milk, food, dental appliances, photograph materials, paint, varnish, oil, printing ink, pianos, rubb chemicals, and timber. The general rule is to use lar coke on these boilers, hand fired, although a small numb of mechanical stokers, such as the Bennis, and Hodgkins and Crosthwaite sprinkler types may be found, on whi

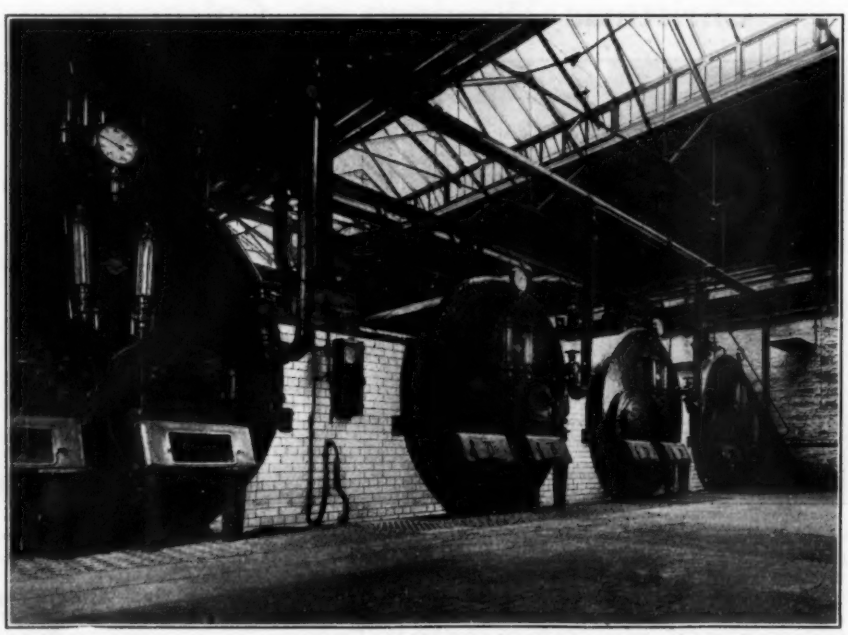
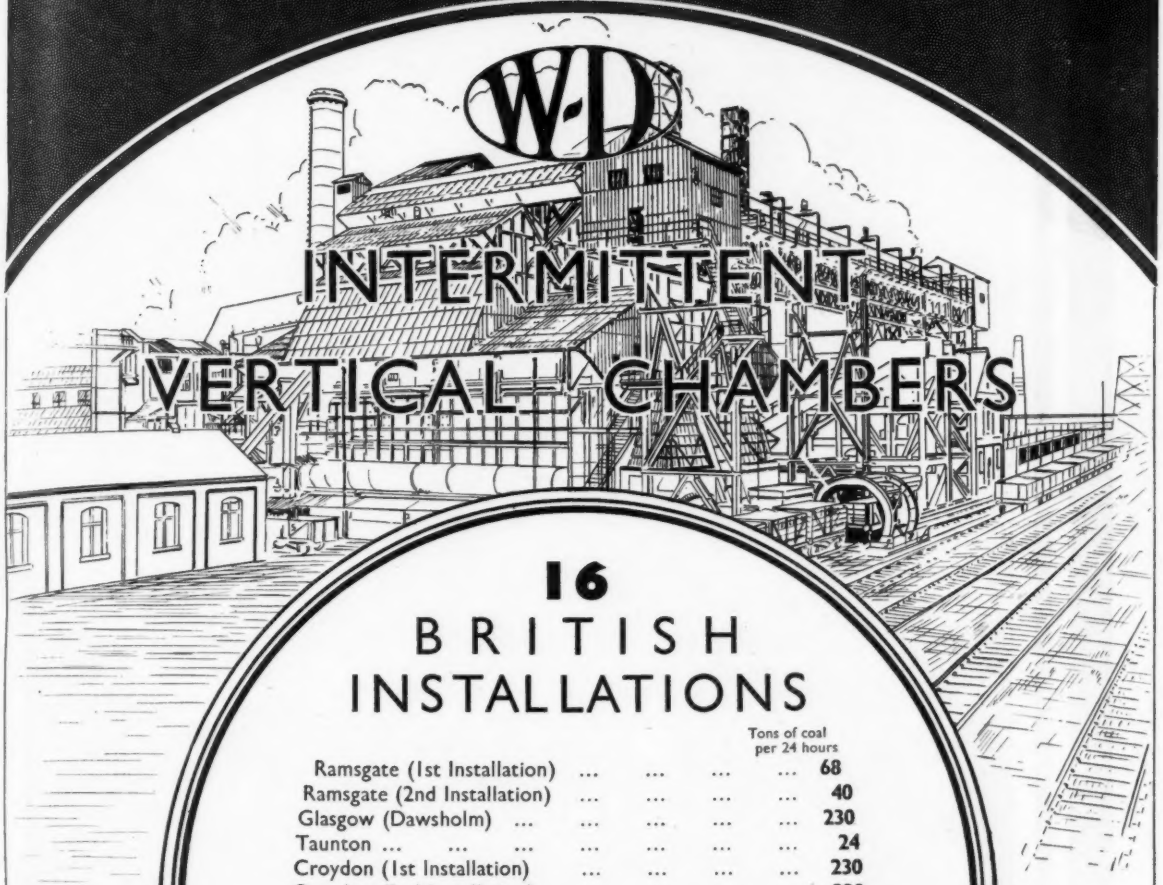


Fig. 1.—A typical coke-fired boiler plant showing four Lancashire boilers operating on forced draught with special silencing ducts fitted to the air intake.

W-D

INTERMITTENT VERTICAL CHAMBERS



16 BRITISH INSTALLATIONS

	Tons of coal per 24 hours
Ramsgate (1st Installation)	68
Ramsgate (2nd Installation)	40
Glasgow (Dawsholm)	230
Taunton	24
Croydon (1st Installation)	230
Croydon (2nd Installation)	230
Gas Light & Coke Co., Southall (1st Installation)	300
Gas Light & Coke Co., Southall (2nd Installation)	300
Southampton	180
Huntingdon	10
Fuel Research Station (East Greenwich)	9
Portsmouth (Hilsea)	253
Tottenham	373
Townsville (Australia)	16
Wandsworth (1st Installation)	240
Wandsworth (2nd Installation)	200

TOTAL CAPACITY

2703

TONS PER 24 HOURS

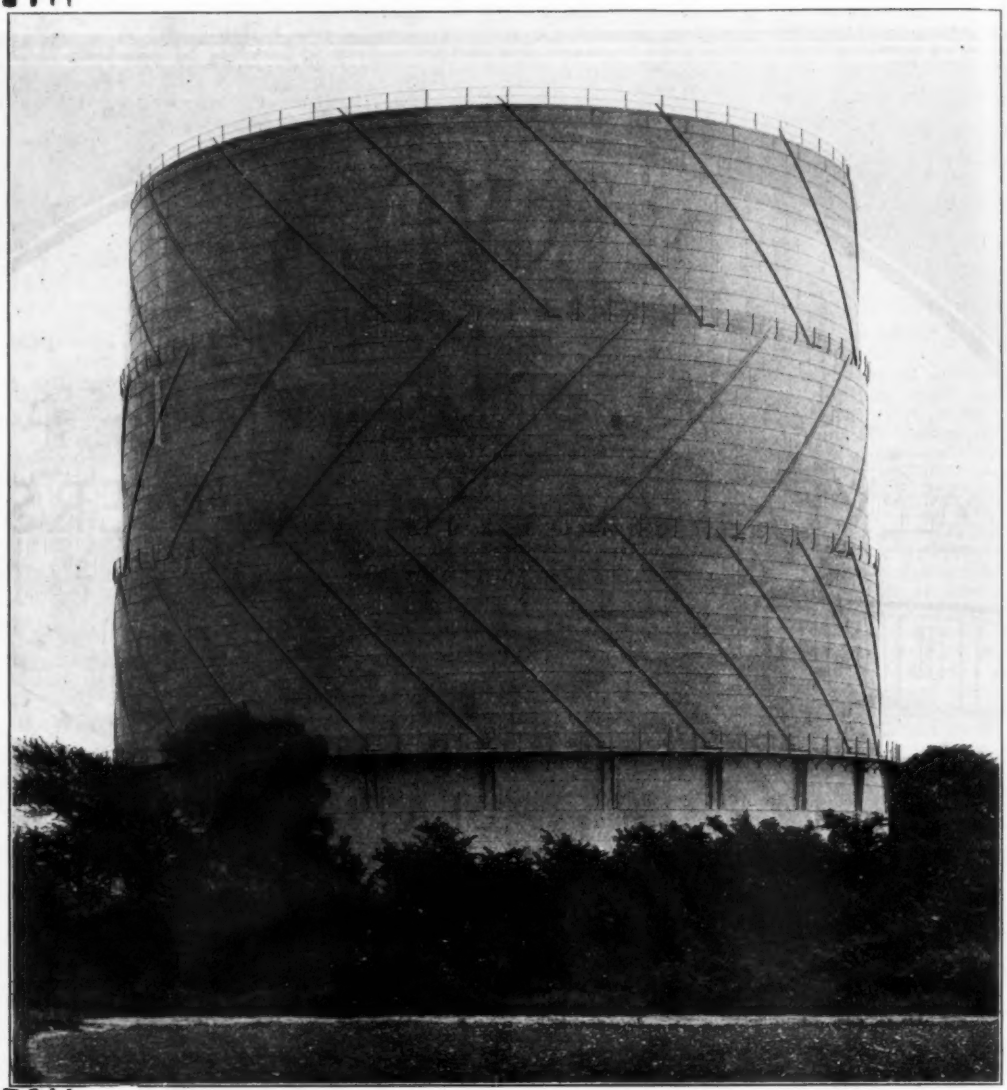
THIS TYPE OF CHAMBER WILL CARBONISE **DURHAM** OR **YORKSHIRE COALS** WITH EQUAL FACILITY

At Tottenham for the months of Sept. and Oct., 1934, in normal operation using 55.2% Yorkshire, 42.1% Durham & 2.7% Derbyshire coals (average "inerts" 9.3%), the average yield per ton of coal was **82.2 THERMS OF 550 B.Th.U. GAS**

W-D

THE WOODALL-DUCKHAM VERTICAL RETORT AND OVEN CONSTRUCTION CO. (1920) LTD., EBURY & ALLINGTON HOUSES, 136-150 VICTORIA STREET, LONDON, S.W.1

MEMBERS OF THE SOCIETY OF BRITISH GAS INDUSTRIES



Steel Tank	...	...	...	140' 6" dia. x 37' 3" deep.
Inner Lift	...	...	...	132' 6" ,, x 36' 3" ,,
Middle Lift	...	...	...	135' 3" ,, x 36' 3" ,,
Outer Lift	...	...	...	138' 0" ,, x 36' 3" ,,
Capacity ...	...	...	...	1,500,000 cubic feet.

Manufactured and Erected for

THE CROYDON GAS COMPANY,

W. Grogono, Esq., Engineer.

ROBERT DEMPSTER & SONS, LTD.

Wire: "DEMPSTER" ELLAND

ELLAND

'Phone: ELLAND 261

LONDON OFFICE: 16, Queen Anne's Gate, Westminster, S.W.1

Wire: "ELLANDORS, PARL, LONDON." Phone: Victoria 3661.

any surplus small coke or rough breeze may be burnt with quite good results.

Types of Boiler.

The types of boiler most frequently used in these installations are:

(*a*) Vertical cross tube.
(*b*) Vertical fire tube.
(*c*) Economic.
(*d*) Lancashire and Cornish.

Vertical Cross-Tube Boilers are not often found in sizes

Fig. 2.—A Cochran vertical boiler installation.

over 1,000 lbs. per hour evaporation. They are inexpensive in initial cost, cheap to install, and take up very little floor space. Their efficiency, however, is low—normally round about 50%, with very often as small an evaporation as 6 lbs. per lb. of fuel as fired. The boiler depends almost entirely on radiation for its method of transferring heat either from the fuel bed or from the flue gases, so that the load is very limited, particularly on coke, for over certain ratings the heating surface is insufficient to absorb all the heat generated. This disadvantage is noticeable with coke fuel should the load exceed certain limits, as the radiation intensity of the coke flue gases is not so high as that from smoky coal fuel, and coal may enable higher overloads to be obtained, although at the cost of a further considerable reduction in efficiency.

For larger installations where a vertical boiler is required on account of its small floor space, the provision of fire-tubes has the effect of noticeably increasing the efficiency. A typical boiler—the Cochran—has one bank of water tubes immediately over the firebox. In order that these tubes may be accessible the back boiler plate may not be water cooled, and to avoid its burning away efficient lagging is not possible either, causing high radiation losses. Apart from this the boiler is surprisingly efficient and economical to run. The fire-tubes are eminently satisfactory from the viewpoint of coke burning, as they allow the transfer of heat from the flue gases by convection, and coke gives the advantage with these boilers that, apart from increased combustion efficiency, the flue-tubes keep clean longer and there are no sooty deposits to affect the transfer of heat to the water. A typical test taken on one of these boilers, comparing coke and coal, is given.

Test at a London Laundry.

Duration of trial	1 week
Class of fuel	Beckton oven coke (2 in. × 3 in.
Type of boiler	Cochran 17 ft. × 8 ft.
Grate area	37 sq. ft.
Boiler steaming hours	52
Steam pressure, lbs. per sq. in.	115
Temperature of feed water	120° F.
Average load per hour	3,513 lbs.
Lbs. of water evaporated per lb. of coke	8·36 ,,
Equivalent evaporation per lb. of fuel from, and at, 212° F.	9·5 ,,
Fuel consumed per sq. ft grate area	11·4 ,, (average rate during trial)
Efficiency of boiler	71·5%

The week's test with oven coke showed that 9 tons 15 cwt. of coke were used. The tonnage of the coal used over the same period was 10 tons 15 cwt.

The Economic Type Boiler is one enjoying considerable popularity for use with coke fuel in a wide range of installations where a little more floor space is available. The boilers are either of single or twin flues set in a boiler shell into which the furnace is fitted. An extension of the flue beyond the furnace gives ample so-called combustion space, which in reality serves for the transmission of radiant heat from the hot flue gases when coke is burnt, combustion with secondary air being only effected with coal fuel. The gases then pass through banks of fire-tubes running the whole length of the boiler, these tubes providing sufficient heating surface to give effective transfer of the heat content of the gases by forced convection. The flue gases may be collected in the " smoke " box on the front of the boiler with a stack running from the front, or if mounted in a brick setting, the outside shell of the boiler and the inside wall of the brick setting form a further flue space, and the gases then pass out through a stack at the back of the boiler.

The essential part of the furnace, the grate, is usually 5 ft. 6 in. in depth with a deadplate in front, of 6 in. to 1 ft., and is in two sections, the bars running from front to back with a bearer bar about 3 ft. from the front of the boiler. The bridge at the back should be preferably of firebrick. Many furnace manufacturers put forward an air cooled, cast-iron bridge, claiming a longer life. This, however, introduces unnecessary air space to the flue and causes a reduction in efficiency, but it has another disadvantage that, being primarily a smoke-burning device, it enables the boiler to be the more readily converted to coal burning, should it be wished. Moreover, the loss of efficiency occasioned by the admission of this air supply counterbalances the advantage gained in lengthening the life of the bridge. A typical test on an Economic boiler is

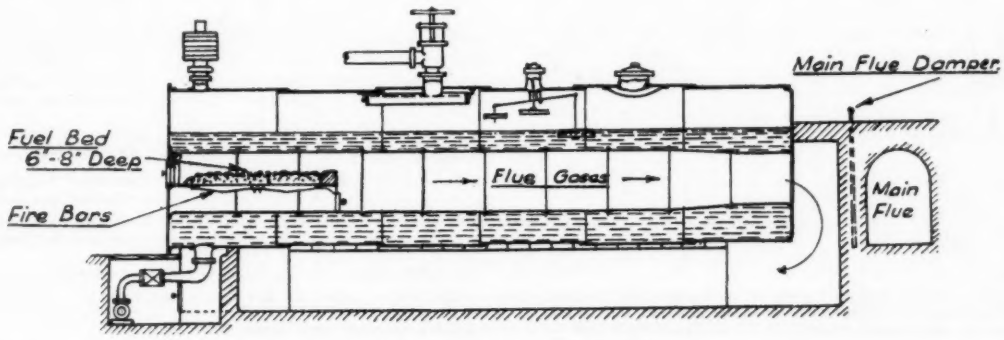


Fig. 3.—Diagram of a Lancashire Boiler.

Showing arrangement of the flue ways, the position of the grate, and showing how an even distribution of coke over the grate to a height of 6 in -8 in. gives the highest operating efficiency.

given to indicate the results obtained on coke with this type of boiler.

Test at a London Hospital.

SUMMARY OF RESULTS.

Fuel.	Powell Duffryn Large Smokeless Steam Coal.	Beckton 2 In. × 3 In. Oven Coke.
Date of test	May 31, 1933	
Duration of test	8 hours	
Number of boilers under steam	1 No. 3 Davey Paxman	
Total heating surface	1,128 sq. ft.	
Total grate area	36 ,,	
Type of firebars in use	Straight pattern with ½ in. air spaces	
Ratio heating surface to grate area	1 31·3	
Calorific value gross as received	14,071 B.Th.U.	13,000 B.Th.U.
Total weight consumed	2,688 lbs.	3,304 lbs.
Average consumed per hour	336 ,,	413 ,,
Consumed per sq. ft. of grate area per hour	9·33 ,,	11·47 ,,
Average thickness of fires	3 in.	6 in.
Weight of ashes and clinker	252 lbs.	234 lbs.
Percentage of ashes and clinker	9·4%	7·08%
Steam—		
Average gauge pressure per sq. in.	94·3 lbs.	88 lbs.
Water—		
Total quantity evaporated, actual	26,900 ,,	32,300 ,,
Equivalent evaporation from and at 212° F.	30,401 ,,	36,273 ,,
Actual evaporation per lb. of fuel	10 ,,	9·78 ,,
Equivalent evaporation per lb. from and at 212° F.	11·31 ,,	10·98 ,,
Factor of evaporation	1·131	1·123
Average temperature going into boilers	128° F.	134° F.
Evaporation per sq. ft. heating surface from and at 212° F.	3·37 lbs.	4·01 lbs.
Efficiency of boilers	77·8%	81·6%

The Lancashire Boiler is essentially one for which ample space must be available. The boiler shells are frequently 30 ft. long and 9 ft. in diameter, with twin flues 3 ft. 6 in. in diameter, with the furnace in the front of each flue. The flue gases are brought round the bottom of the boiler to the front, thence along the sides to the back and out through the main stack. In order that high efficiencies may be obtained economizers are frequently fitted between the boiler and the base of the stack. These take care of the convected heat transmission from the hot flue gases. The type of furnace is essentially the same as in the Economic boilers, the main advantage of the Lancashire being its large capacity, which allows for heavy fluctuations in load, a particular advantage in factories, works, and hospitals, where demands for steam are made without notice.

Test at Another London Hospital.

RESULT OF TRIAL WITH COKE AS FUEL ON THE STEAM RAISING PLANT.

Description of plant	4 Lancashire boilers, size 30 ft. × 8 ft., fitted with Meldrum forced draught furnaces, steam jet system, grate area 35 sq. ft. per boiler. Green's economizer. Number of boilers at work during trial, 2.
Date of test	Week ended 8 a.m. Sept. 25, 1933
Duration of test	168 hours
Name and class of fuel	Coke (Beckton oven, 2–3 in.)
Total weight consumed	34 tons 6 cwt. (76,832 lbs.)
Average consumed per hour	469 lbs.
Average per sq. ft. grate area per hour	6·7 ,,
Maximum per sq. ft. grate area per hour	15·5 ,,
Average steam pressure lbs. per sq in.	120 ,,
Total water evaporated	777,580 ,,
Average water evaporated per hour	4,630 ,,
Maximum water evaporated per hour	11,000 ,,
Average temperature of feed water to economizer	150° F.
Average temperature of feed water to boiler	235° ,,
Actual evaporation per lb. of fuel as fired	10·12 lbs.
Equivalent evaporation per lb. of fuel as fired	11·21 ,,
Average CO_2 in waste gases	14·5%
Efficiency of boilers and economizer	83·5 ,,
Fuel cost per 10,000 lbs. evaporated, actual	11s. 11d.

The Water Tube Boiler, such as that manufactured by Messrs. Babcock & Wilcox, can be successfully operated on

Test at a West London Confectioners' Factory.

RESULTS OF TRIAL WITH COKE AS FUEL ON A STEAM RAISING PLANT.

Description of Boilers :—Babcock and Wilcox 735 sq.ft Heating Surface Capacity, 2,500 Lbs. per Hour. Working Pressure, 125 Lbs. per sq.in. Number installed, 4. Two have been Converted for Solid Fuel fitted with Crosthwaite Forced Draught Furnaces. Steam Jet, also Fan System. Grate Area, 19 sq.ft.

Time and Date.	No. of Boilers at Works.	Duration of Test.	Fuel Coke. Lbs.			Water Evaporated.				Steam Pressure, Lbs. per Sq.In.	Temperature.		Boiler Efficiency.	Remarks.
			Size.	Total Consumed.	Maximum per Sq.Ft. G.A. per Hour.	Total Lbs.	Maximum per Hour.	Lbs. per Lb. Actual.	Equivalent F. & A. 212° F.		Feed Water.	Flue Gas Boiler Damper.		
		Hours.	In. In.								° F.	° F.	%	
2 p.m., Sept. 7– 6 p.m., ,, 7	Two	4	2 to 3	1,499	10·76	16,500	4,500	11·0	11·9	120	175	450	..	No fire cleaning during this run, and test commenced with clean fires.
6 p.m., ,, 7– 6 p.m., ,, 8	Two	24	do.	6,315	17·2	55,000	6,000	8·71	9·4	120	175	450	70·8	Including banking down, slow firing, and fire cleaning.
6 p.m., ,, 8– Noon, ,, 9	One	18	do.	3,047	24·0	24,000	3,900	7·88	8·52	120	175	500	64·0	One boiler only working. Boiler overloaded. Including banking, slow firing, and cleaning.
Shut down from Noon, Sept. 9. Fires lit up at 6.40 p.m., Sept. 10.														
8 p.m., Sept. 10– 6 a.m., ,, 11	Two	10	do.	2,542	..	19,000	2,500	7·5	8·47	75	120	..	..	Including lighting up and slow firing.
6 a.m., ,, 11– 6 p.m., ,, 11	Two	12	do.	5,266	14·5	48,800	5,100	9·26	10·01	120	175	450	74·4	Continuous working and midday cleaning fires.
6 a.m., ,, 11– 6 a.m., ,, 12	Two	24	do.	6,456	..	55,000	5,100	8·50	9·19	120	175	450	69·1	Including banking down, cleaning, and slow firing.
6 a.m., ,, 12– 6 p.m., ,, 12	Two	12	do.	5,446	16·0	51,700	5,800	9·49	10·25	120	175	450	77·1	Continuous firing and midday cleaning fires.
6 a.m., ,, 12– 6 a.m., ,, 13	Two	24	do.	6,481	..	57,570	5,800	8·87	9·53	120	175	450	72·1	Including banking down, cleaning, and slow firing.
2 p.m., ,, 7– 6 a.m., ,, 13	Two One (Saturday)	104	do.	26,349	17·2	227,070	6,000	8·61	9·3	120	175	450	70·0	Including banking, slow firing, and re-lighting.

The steam jet forced draught system was used throughout the trial except for the last day, when the fan system was tried out. With the fan system it was found necessary to use the steam jets also, to maintain the boiler pressure during peak loads.

The boiler setting had just recently been rebuilt and the boiler had worked about 1,000 hours since last internal cleaning.

	£	s.	d.
Cost of steam per week on coke fuel	= 23	1	0
Cost of raising 318,000 lbs. of steam per week with oil fuel at 70s. per ton — 11·83 tons × 70s.	= 41	8	0
Saving in favour of coke firing, per week	= £18	7	0

coke fuel. This has not the same advantage as the Lancashire boiler of having ample reserve for fluctuating loads, but is of a very much more compact design and as a boiler gives quite high operating efficiencies.

Coke Firing on Natural Draught.

The boilers to which reference has been made all give good results with firing by coke on natural draught, and something between $\frac{3}{8}$-in. and $\frac{1}{2}$-in. W.G. pull at the base of the stack is required, control of the boiler being made almost entirely by the damper in the main flue leaving the boiler. The maximum rate of combustion which can be achieved on natural draught conditions is about 15 lbs. per sq. ft. per hour, varying with local conditions. This is not quite so high as could be obtained with coal or oil fuel. Natural draught conditions are, however, eminently suitable for coke for a variety of reasons:

1. The low rating of the boiler as compared with forced draught gives ample opportunity for radiant heat transfer from the fuel bed and flue gases.
2. The formation of clinker is limited, and that which is formed is of a light and friable nature and does not have any deleterious effect on the grate bars.
3. Only the larger and better grades of fuels can be used on natural draught, and there is less risk of conversion to the use of small, low-grade fuels, whether coke breeze or bean sized coal.

The records of tests given are those carried out under the supervision of Mr. L. J. Mirams, Mechanical Engineer of the Southall station of the Gas Light and Coke Company.

New Coke-Handling Plant

At Brighouse Gas-Works

On Thursday, Dec. 6, there was an interesting ceremony at the Brighouse Gas-Works, when a new coke handling plant was formally opened by the Mayor of Brighouse (Councillor A. Reeve). Those present to witness the ceremony included a number of Engineers from gas-works in the district, industrialists and manufacturers in the town, and Members of the Council.

The new plant is a further step forward towards the production of coke of the best possible quality. Such an aim can only be realized, however, by paying due attention to all phases of the process of production. The first factor which influences the quality of the coke is the quality of the coal used for carbonization. In particular, therefore, when testing coal, the ash content and the fusion temperature of the ash are determined, since these have a direct bearing on the clinkering property of the coke produced. From the experience of the Brighouse Gas Department it is found inadvisable to purchase coal containing more than 5% of ash (dry basis) and having an ash which fuses below 1,200° C.

Coke Cooling.

The carbonizing plant at Brighouse consists of a bench of 24 in. by 12 in. by 20 ft. horizontal retorts. The hot coke is pushed out from the retort into a coke bus, which takes it out of the retort house and discharges it into two quenching boxes. These are entirely novel and of the Department's own design. They consist of two boxes each having a bottom discharge door operated by a hand winch situated in the retort house. The boxes are 5 ft. 6 in. long by 1 ft. 2 in. wide at the top opening to a width of 1 ft. 5 in. at the bottom. The total depth is approximately 7 ft., but the lower 4 ft. of each side is made in the form of a $\frac{1}{2}$ in. water jacket having perforated inner plates, water spraying through these perforations on to the hot coke inside. Owing to the narrowness of the boxes the penetration necessary for the water to reach the hot coke in the centre is only about 8 in.; further, the spacing of the holes of the water jacket is only 6 in., and thus very consistent quenching is obtained. It is found also that the smothering action of the steam produced materially assists quenching. As a further means of ensuring consistency, the time during which water is turned on to the quenchers is timed to the second by means of a seconds clock. The control valve for the water supply, the small hand winch for operating the discharge doors of the quenching boxes, the push button control for the skip hoist, and the seconds clock are all centralized at a convenient position in the retort house. Thus the stoker operating the coke bus, who has control also of the quenching and hoisting, can carry out his work with the greatest convenience.

The New Screening, Cutting, and Storage Plant.

The new plant consists of a semi-automatic twin skip hoist, belt conveyor, Zimmer type screens, cutter, and three storage hoppers. It is capable of dealing with 20 tons of coke per hour, while the total storage capacity, originally consisting of six 12-ton hoppers, has been increased by 100 tons by the addition of the new hoppers. The Contractors were Messrs. Drakes, Ltd., Halifax, while the coke cutter was supplied by the Phœnix Supply Company, and electric motors (totally enclosed gas-works type) by the Lancashire Dynamo Company.

(a) Skip Hoist and Belt Conveyor.

In order to ensure low maintenance costs the number of working parts on a coke handling plant should be reduced to a minimum. On this account a skip hoist has been preferred to a bucket elevator. This is of the semi-automatic type and is operated by push-button control; loading and emptying of the skips is entirely automatic, while the ascending skip automatically stops the hoist when it reaches the top. Thus, starting with No. 1 skip full of coke in the bottom, and No. 2 skip at the top empty, by pressing the appropriate button, the latter skip goes to the bottom and is filled with coke, while the former comes to the top, discharges and, at the same time, switches off the current. Then, by pressing a second button, No. 1 skip goes down to the bottom and No. 2 skip is brought to the top.

The skips discharge into a hopper at the top from which the coke is fed to a band conveyor which finally delivers it to the screens.

(b) Scalping.

It was an unavoidable feature of the old method of "straight" screening that the moisture and ash contents of the smaller sizes of coke were invariably higher than those of the larger sizes. It is found, therefore, that if the smaller coke is initially separated from the larger coke the effect is to separate the poorer from the better quality material. If this superior, larger sized coke is then cut and graded into smaller sizes, the quality of such cut cokes is the same as that of the original large coke and therefore is superior to the small coke previously removed. This fact is emphasized by the following analysis, both samples being taken from screenings from the same original bulk.

—	% Moisture.	% Ash (Wet).	% Impurities.
Cut coke, 2 in. × 1¼ in. .	1·9	4·2	6·1
Scalpings, 2 in. × 1¼ in. .	6·7	6·4	13·1

It is primarily on the basis of this important fact that the new screening plant has been designed.

The first screen on to which the coke is delivered is a scalping screen of 2 in. square mesh. All the coke taken out by this screen is then dealt with on screens operating at right angles to the primary screens, and is graded into three sizes, 2 in. by 1¼ in., 1¼ in. by $\frac{5}{8}$ in., and below

⅜ in. A large portion of this material is used on the works and the remainder sold as second quality material.

(c) *Cutting.*

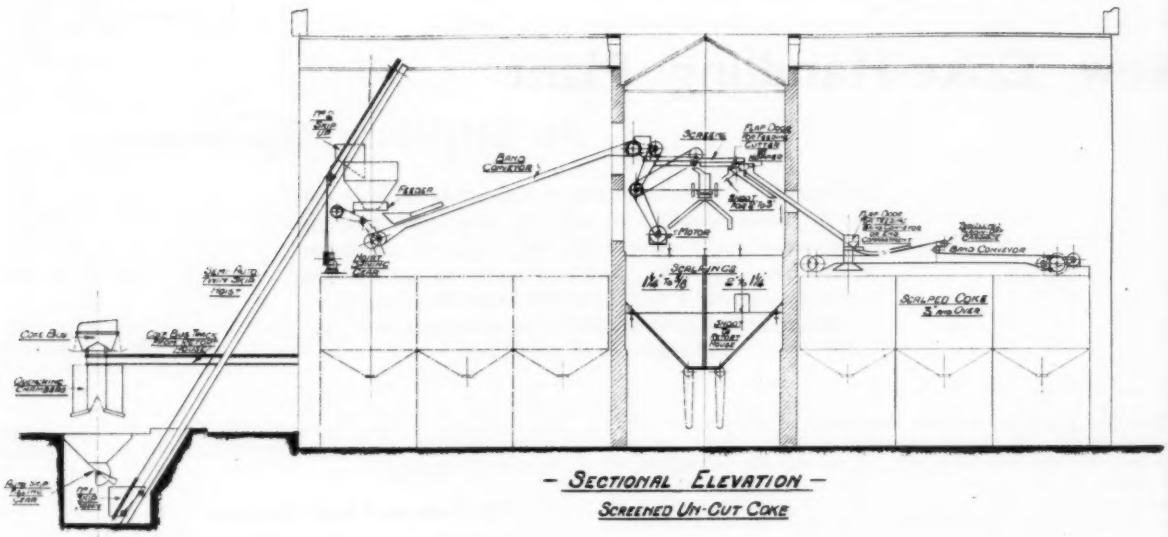
The larger coke passing over the 2 in. screen is clean and dry and passes on to a 3 in. square mesh screen. Two sizes of coke are thus produced—namely, 2 in. by 3 in. and over 3 in.—and both may be diverted along either of two paths, that is, they may be put directly into stock or may be fed to the coke cutter. Thus there are four different ways in which the plant may be worked, as follows:

(1) The 2 in. by 3 in. coke and coke over 3 in. may both be put into storage in separate hoppers.

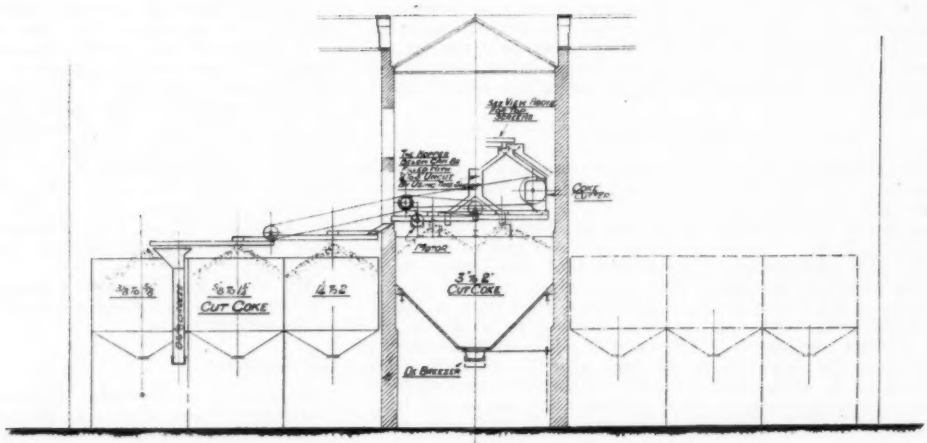
type, while all screen plates have square mesh. It is found that by this combination very accurate screening is obtained. Further, in order to reduce wear of the screens the largest size is always taken out first, then the next larger, and so on, this being exactly the reverse of the old-fashioned method of "straight" screening.

(d) *De-Breezing.*

It sometimes happens that some coke is broken up when it falls off the screens into the hopper. This results in the formation of breeze which may be a grave disadvantage, especially in the case of larger sizes of coke. Therefore, as a further safeguard to quality, all the large coke over



— Sectional Elevation —
Screened Un-Cut Coke



— Sectional Elevation —
— Screened Cut Coke —

PLAN OF THE NEW COKE HANDLING AND SCREENING PLANT AT BRIGHOUSE.

(2) The 2 in. by 3 in. coke may be put into storage while the other coke is put through the cutter.

(3) The 2 in. by 3 in. coke may be put through the cutter while the other coke is put into storage.

(4) Both sizes may be put through the cutter together.

All coke from the cutter is fed to a second series of screens over which it is graded into the following sizes: Through the cutter and over 2 in., 2 in. by 1¼ in., 1¼ in. by ⅝ in., ⅜ in. by ¾ in., and below ⅜ in.

Owing to the flexibility of the plant the method of working may be adjusted at any time to cope with fluctuations in the demands for any sizes of coke.

All the screens on the plant are of the high-speed Zimmer

3 in. and all 3 in. by 2 in. coke is loaded over de-breezing screen which remove all breeze below ¾ in.

Quality.

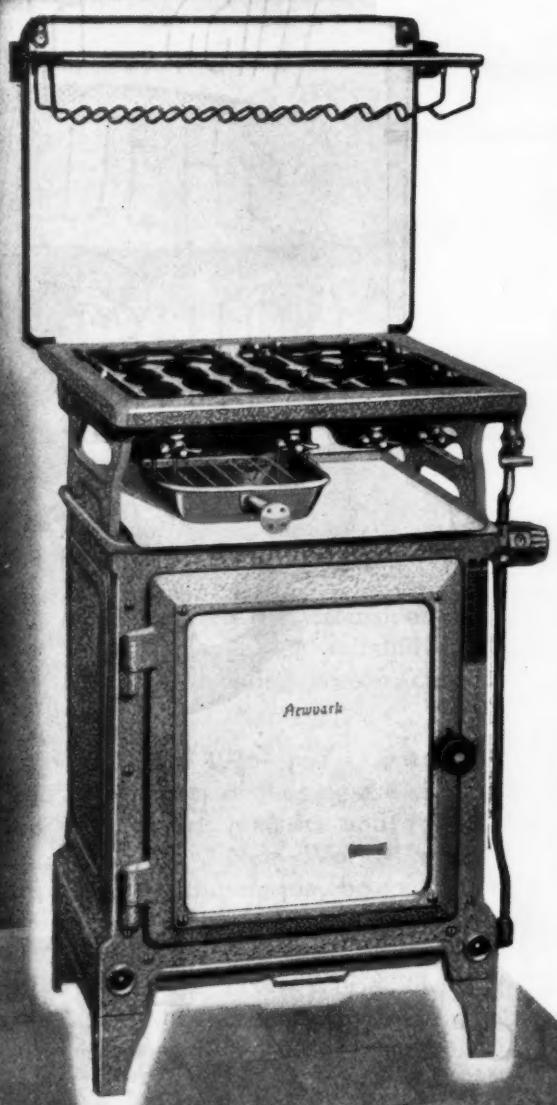
In order to obtain the greatest efficiency and therefore the greatest economy in the use of coke, it is essential that the fuel should be of the best possible quality and that its size should be specially selected to suit the appliance in which it is being burnt. By the installation of this new cutting and grading plant the Brighouse Gas Department have attained a higher standard of quality than ever before, and, in addition, the fuel is available in a wide range of sizes, so that the size most suited to any application may always be obtained.

RESOLVE NOW TO ADOPT

The PARKINSON

NEWPARK GAS COOKERS

THE FINEST PROPOSITION FOR REPLACING BLACK COOKERS



The "Newpark" series of gas cookers has been adopted by many important Gas Undertakings as the ideal all-enamelled cookers for replacing black cookers on Permanent Hire and Hire Purchase terms, in sizes to suit all requirements. The maintenance reports of these undertakings show exceptionally low upkeep costs with a high standard of cooking efficiency. Let 1935 show a reduction in the number of black cookers on your district by adopting the "Newpark," and thus ensure greater consumer satisfaction.

AVAILABLE IN 3 SIZES

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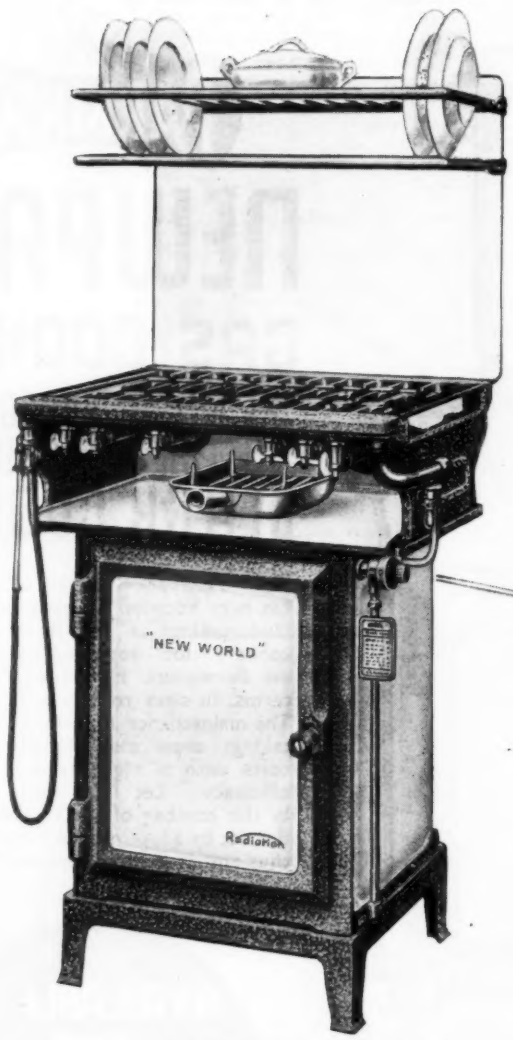
MISS 'REGULO'



The "REGULO" *Control*

The "Regulo," based on more than thirty years' experience with all-metal thermostats for hot water apparatus, has never required alteration in principle since its adaptation to the "New World" Cooker, first introduced in 1923. Our knowledge—that the accuracy required of an oven thermostat precludes the use of gearing mechanism—has determined us to retain consistently the direct action of the original "Regulo."

Radiation

SHOULDERS THE COOKING LOAD . . .

THE year 1935 will see big extensions in gas cooking, and for this the unfailing reliability of the "New World" Regulo-controlled cooker deserves the lion's share of the credit.

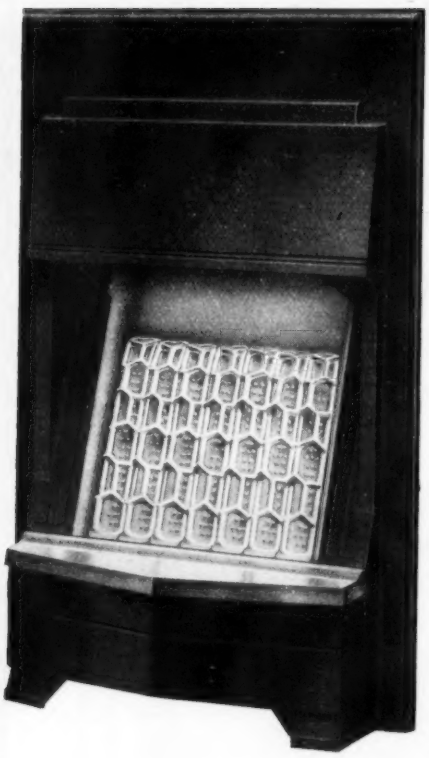
Since its introduction in 1923—just 12 years ago—the Public has had ample opportunity of judging the merits of "Regulo" cooking, and the verdict is clear and unmistakable. The amazing success of the "New World" oven principle of design by which whole dinners may be cooked simultaneously without attention (due to the cooler zone) has given to gas cooking a lead that is the envy of competitors. Wherever household cooking is done, the "New World" with its "Regulo" control is the standard of excellence by which all other cookers have come to be measured.

The "New World" is in a class by itself.

REGULO - CONTROLLED

NEW WORLD

COOKERS AND RANGES



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20 % more useful heat in a modern form that is universally acceptable.

Cannon Iron Foundries Ltd., Deepfields, Bilston, Staffs., and Thames House, Westminster, London, S.W.1

A Yorkshire Junior Gas Association

Presidential Address of R. HALKETT, Junr.

Read at Sheffield on Dec. 15, 1934

Mr. Ralph Halkett, Junr., is the son of the General Manager and Secretary of the Sheffield Gas Company. He was born in Dorset, and educated at Glasgow High School and King Edward VII. School, Sheffield, having also studied at Sheffield University. He commenced his career in the Industry as an articled pupil with the Sheffield Gas Company, during which period of five years he passed through all departments of the Undertaking. He was appointed assistant to the General Manager and Secretary in 1927, becoming Assistant General Manager in 1932.

R. Halkett, Junr.

I propose to confine my remarks to a synopsis of the progress of the South Yorkshire Gas Grid, which is being promoted by the Sheffield Gas Company following powers granted by Act of Parliament in 1931. It is safe to say that the Sheffield Gas Company owns the one and only real Gas Grid in this country at the moment.

The Sheffield Gas Act of 1931 was the ultimate outcome of the publication of the Area Gas Supply Report, which in turn was a compilation of the facts received in evidence given before the Departmental Committee. In the first place two Bills were promoted, one by the coke oven owners entitled the " South Yorkshire Gas Network " and the other one by the Sheffield Gas Company for extension of powers to construct the Grid.

The Area Gas Supply Report recommended that the Grid should be owned either jointly by the Coke Ovens and the Gas Company or by the Sheffield Gas Company alone, and in view of this fact conferences were held between ourselves and the coke oven owners, after which an agreement was arrived at whereby not only was their own Bill withdrawn but their opposition to ours was also withdrawn, leaving the Sheffield Gas Company's Bill to proceed.

By the powers of the 1931 Bill the limits in which the Sheffield Gas Company are able to purchase coke oven gas have been considerably extended beyond what they were previously, and embrace some 19 coke ovens to connect all of which to the Grid the Area Gas Supply Committee estimated would involve the laying of approximately 73½ miles of mains.

Steel Pipes.

It was decided to lay the first section of the Grid in steel pipes, the specification being:

Physical Properties and Tests.

—	Lapwelded.	Hot Rolled Weldless.
Tensile strength, tons per sq. in.	24 to 28	26 to 30
Elongation on 8-in. test piece .	20%	20%

Finish.—All tubes shall be smooth inside and outside, and free from scale, blisters, and other surface defects.

Hydraulic Test.—All tubes hydraulically tested before dispatch. Before leaving the makers' works the pipes are carefully covered with a special sheathing devised to protect them against any deleterious action by subsoil, &c., and a test for insulation against electric current gave the following result:

> After immersion in water at 52° F. for 24 hours, the insulation resistance was 1,000 megohms. On raising the temperature of the water to 130° F. the insulation resistance fell to 300 megohms, gradually recovering to 1,000 megohms at 80° F.

Both British Mannesmann and Stewarts & Lloyds tubes were used. The works of both firms were visited by the Gas Company's officials and the sheets of steel were inspected. Tubes were also seen in process of manufacture and the sheathing being coated on to their external surface.

This sheathing was specially devised in the first place for the grid pipes, and I believe is now widely used by the manufacturers on their pipes to-day.

Before being loaded at the makers' works all pipes are whitewashed externally. This enables any damage caused to the sheathing in transit or during handling to be easily detected, and in consequence ensures that no pipe is placed in the ground, the outer covering of which may have been punctured in any way.

Joints.

In connection with the pipes we devised a special joint which allows sufficient deflection as to enable the line of main to be readily laid round curves and deviations when using the ordinary and standard lengths of pipe. This joint is of special interest, inasmuch as a deflection of 5 degrees from the centre line of the preceding pipe can be obtained in any direction. In consequence of this and with the help of shorter lengths as distinct from the standard 24 ft. lengths, special bends are to a large extent avoided, and deviations in the line due to obstructions are overcome quite easily without any delay arising through having to wait until specials are made.

The larger pipes are heavy, and to ensure that the spigots are home in the sockets two different methods of pulling and temporarily holding the pipes together have been devised. In the one case three lugs equally spaced round the circumference are welded on each end of all pipes, and after introducing the spigot to the socket in such a manner as to bring the lugs on the two ends in line, long bolts are threaded through the holes in these lugs and then drawn up with a spanner. After the joint is " tack-welded," the bolts are withdrawn and used over and over again. In order to give sufficient flexibility in the bolts to enable the pipes to be drawn together and fixed at any deflection up to the maximum, the holes in the lugs are enlarged, and special cup washers are used under the head and nut of each bolt.

The other method is similar, but clips are used instead of lugs. Experience has proved, however, that the welded-on lugs are the quicker and more satisfactory method.

Transport.

The pipes are handled in every case from the nearest goods station on the railway, except that at the commencement, when the main was sufficiently near to the Grimesthorpe Gas-Works, our own siding was used.

In order to deal with the transport of the pipes, many of which are over 25 ft. long, we purchased a special Ford Truck-Tractor, which has proved extremely valuable on account of the ease with which the pipes can be loaded and unloaded. The trailer can be left either loading or unloading, and the tractor can be used for some other purpose during that period—for example, moving the compressing plant or welding plant from place to place. Recently a second trailer has been purchased fitted with a low sided body which again makes the truck-tractor very adaptable for other purposes.

Tools.

Air compressors and pneumatic tools are used whenever possible and have proved invaluable. The road rippers,

light rippers, spaders, and tampers are in constant demand for cutting out tar macadam, concrete, and all the harder classes of subsoil down to rock. The use of the pneumatic mechanical tampers for back-filling is much favoured, and every opportunity for their use is taken, as this not only saves time and money in re-instatement but reduces the quantity of surplus soil to be removed to the tip. The results with regard to the last-mentioned point are amazing.

The compressing plant used is the Holman Hele-Shaw Beacham type having an air displacement of 162 c.ft. per minute.

The compressors also supply air to drive a useful form of centrifugal pump which is employed to clear the surface water that collects from time to time in the trenches.

The welding plant used is a portable type made by Messrs. G. D. Peters & Co., Ltd., and is one of their Wilson "Plastic Arc" S. Type machines, with a welding range of 30 to 250 amperes. The generator is run by a Dorman four cylinder petrol engine, and the whole plant is fixed in a suitable frame mounted on springs and rubber tyred wheels. Like the compressing plant it can be towed by a motor vehicle. We have proved electric welding to be the best method.

Lifting legs of a standard type, modified by ourselves, are used for lifting and lowering the larger mains into the trench. Special rubber and canvas slings which we make ourselves are used in every case where these pipes are handled, in order to prevent damage to the sheathing. In many cases several pipes were welded together on trestles, and the complete length lowered into the trench afterwards by the lifting tackle.

Mechanical Diggers.

Two mechanical diggers of the Allen-Parsons type are in use. The maximum and minimum widths of trench which they can cut with the cutters supplied with the machine, and which are suitable for our requirements are 2 ft. 6 in. and 1 ft. 3 in. respectively, and the maximum depth with the present boom is 6 ft. Each digger is driven by a four cylinder petrol engine and runs on caterpillar tracks. No road tax is required to be paid, but a blank licence and registration number has to be obtained before the machines can be taken on the high road. The maximum speed allowed on the road is 2 miles per hour and the law does not permit of it travelling more than 6 miles in one day. The consumption of petrol when digging is approximately one gallon for every 3 yards excavated. The neat appearance of the trench cut by these diggers cannot be too strongly emphasized. In the subsoil the sides are perfectly straight and square, and it is noteworthy that there is no variation in either the depth or width of the trench once the boom has been set.

The deeper the trench the more economically it is excavated. It will be realized that if a depth of trench of 4 ft. or more were to be excavated by hand it would be necessary to have at least another man on the outside of the trench trimming up the surplus earth as it was thrown out. Similarly in a very much deeper trench a stage would be necessary and soil would be thrown out from one man to another, and in this way three men would be required. It is in cases such as this that obviously the mechanical digging machine has a decided advantage.

Pipe Lines.

Commencing from the Grimesthorpe Gas-Works, the first section of the trunk main consists of 4½ miles of 24 in. pipe, to Munsborough Lane, Greasborough. On leaving the Grimesthorpe Gas-Works the 24-in. diameter main crosses a little-used road by way of our own railway bridge, and along the railway siding through our Chemical Works. It then enters the public thoroughfare, where it is laid in the footpath. As far as possible we have always kept the main in the footpath, where there is less vibration from the traffic. Very soon after leaving the Gas-Works it was necessary to cross the main line (four tracks) of the London, Midland, and Scottish Railway Company. Arrangements were made with the Railway Company to run the main across parallel to the road bridge on steel supports, which we had to provide and erect.

A Sunday was chosen as being comparatively free from traffic. Fog signals were in operation at a certain distance from the bridge in either direction to warn oncoming trains. A flagman, provided by the Railway Company, was also in attendance. The pipe was welded in two or three sections, slung in cradles attached to the jibs of four steam wagon cranes, and drawn along the side of the bridge. On the railway bank a staging was erected on which the welder stood and welded each section as it was drawn into position for him by the steam cranes. In this manner it was possible to lift and slide the pipes by degrees in one movement. The main itself rests on rollers fitted on top of the steel supports. These rollers are primarily there to prevent damage to the sheathing of the pipe, and any chafes were patched immediately.

To return to the progress of the trunk main, it continues through the streets of Sheffield and later through private ground until at a point in Munsborough Lane, Greasborough, a 24-in. by 10-in. "Y" piece was inserted for the 10-in. branch main three-quarters of a mile in length to connect the coke ovens of the South Yorkshire Chemical Company.

From Munsborough Lane the trunk main is continued, 24 in. in diameter, for a further 2·1 miles through the small village of Greasborough along the main road from Rotherham to Barnsley. The main street is very narrow, and as it is a bus route, the laying of the main involved many difficult problems which eventually were satisfactorily solved.

From here the main continues north to the village of Nether Haugh, where there is another 24-in. by 10-in. "Y" piece which forms the junction of the branch from the coke ovens at Wharncliffe Silkstone situated 6 miles away from this point near the village of Tankersley. Again from this 10-in. diameter branch another one 6 in. in diameter a distance of 1·8 miles is taken to supply the Elsecar Works of the Sheffield Gas Company with gas.

From Nether Haugh the trunk main, still 24 in. in diameter, continues north for three-quarters of a mile to the Wentworth Road. This is the furthest extent to which we have so far carried this main, but from this point will be laid the 10-in. diameter branch to the coke ovens at Manvers Main Colliery, some 3½ miles away.

Valves.

There are no valves on the first 6 miles of the trunk main. Should it be required to have the gas cut off on this portion of the main, it would mean cutting off all the supplies, and therefore there is no necessity for a valve. On each branch two valves are fixed, one as near as possible to the point where it joins the trunk main, and the other at the boundary of the coke oven owners' property. This latter point in each case is known for identification purposes as point "D."

In order that the valves may not be subject to the danger of fracture due to expansion and contraction, or the thrust of the steel main from any other cause, short flange and spigot, socket and spigot pieces, with Stanton-Wilson joint, are placed on each side of the valve itself.

From point "D" to the compressing plant the main is the property of the coke oven owners, and I may say that in each case so far we have been entrusted to lay this portion on their behalf.

Tests.

The testing of the joints is an item which receives the strictest attention. First of all stoppers, of our own design, were placed in each end of the main. The first section to be tested was a long one. As we had available a supply of compressed air at 70 lbs. per sq. in. at the gas-works, a connection was made from the receiver to the trunk main and the whole of the first section of the Grid tested.

When the gauge at the end of the main showed 50 lbs. per sq. in. pressure, the air supply was cut off. Every joint was subjected to the usual soap-sud test. The man carrying out this work was followed by a responsible official, who also inspected the tests. On the completion of this examination an observation of the pressure gauge was made, and if this disclosed no fall in pressure during that period, and provided that no leaky joints were found, the air in the main was released.

After the first section of the main had been put into operation the supply of compressed air from the gas-works could no longer be used, and the portable Holman compressors were substituted for raising the pressure in the sections of the main under test. This is always done after the men have ceased main laying for the day, so as to reduce the waiting time while testing.

The greatest care is taken in testing the joints, and on the slightest appearance of a leak that particular joint is marked, and, after letting the air escape, is re-welded and tested. These occasions are very rare, as after the first week of experimenting with the electric welded joint, the welders gained such skill as enabled them to work up to nearly 100% efficiency.

We have now in our employ a welder engaged entirely upon this work, who, during the past 18 months, has made a perfectly sound joint in every case on a once-run joint, and we have not found one suspicion of even a "weep."

On completion of a test the joints are encased in special moulds into which a hot bitumen solution is run. As soon as this moulded bitumen is cooled sufficiently to retain its position, the moulds are removed, re-limewashed on the inner side to prevent adhesion of the bitumen, and fixed

round the next joint. Our records show that the moulders can cope with twenty-eight 24-in. joints in a working day with ease.

Labour.

The whole of the construction of the Grid has been carried out by our own Engineering and Street Mains Departments, and no contractors' men have been engaged apart from two or three welders, who are required to augment our own.

In most cases the final re-instatement is carried out by our own staff of workmen. Wherever the Local Authority preferred to do their own re-instatement, a special scale of charges has been agreed upon.

Purging.

In the first place, the available initial pressure is ascertained, and the theoretical time for purging is calculated by the application of Pole's formula. It is interesting to note how closely practice agrees with theory. In every case the main is purged from the gas-works end to the coke ovens. When reasonable care is used, particularly with regard to the speed at which the main is purged, the cut point between air and gas is remarkably sharp, and the actual loss of gas is infinitesimal.

Control of Supplies.

The gas supplies from the coke ovens have to conform to a certain standard of quality and purity. This standard was agreed upon between ourselves and the coke oven owners, and the following specification was drawn up and scheduled to our Act of 1931.

The calorific value has to be maintained at not less than 515 B.Th.U. averaged over 24 hours, with a tolerance of 5% above or below, but the quality must not be 5% *plus* or *minus* for more than two consecutive hours in any one day. To enable us to keep a check on the various supplies it became necessary for us to devise a system whereby we can immediately ascertain not only the calorific value of the gas being pumped into the Grid, but also the rate at which each plant is delivering.

To meet a demand for gas such as we experience in Sheffield, with violent fluctuations and a 50% drop at week-ends, it is necessary for us to vary the quantities that we require from day to day. We keep constantly in touch with the output of gas by ascertaining every hour the quantity consumed, and we regulate the supplies accordingly.

After a good deal of consideration had been given as to the best method of keeping the supplies under control, it was decided that the most satisfactory method would be to devise a scheme whereby it would be possible to ascertain at any moment the exact amount of gas which each coke oven plant was delivering into the Grid.

It was obvious that some form of electrical indication would be a solution to the problem. We therefore approached Messrs. Standard Telephones and Cables, Ltd., and put the proposition to them together with our suggestions for a scheme. Many months were spent in experimenting, and many conferences were held, until eventually a system was devised which has now been working continuously for nearly 12 months, and is giving every satisfaction.

Consideration was given to laying private cables in ducts parallel to the Grid Main, for the purpose of this control system. The Post Office Telephones offered suitable communication by private wire, and after negotiations, the case being a unique one, satisfactory terms were mutually agreed upon, and finally this method was adopted and is working very well. The rent for the private telephone lines is £8 4s. 2d. per mile per annum. This system enables us to ascertain the exact reading of the meters at the inlet to the compressors at the coke oven plant, and also to ascertain the calorific value of the gas.

I will give an illustration of the utility of this system. Instructions are given as to the quantity that we require from each of the coke ovens. Normally a reading is taken of each of the meters hourly provided the results show that the quantities are as per instructions. Should any one of the readings show a discrepancy in the quantity, the coke ovens concerned are immediately informed by private telephone, and more frequent readings are taken until we are satisfied that they have resumed the normal quantity. In the same way any discrepancy in calorific value is ascertained and rectified. The private telephone system has the added and distinct advantage that in case of necessity all coke ovens can be addressed at one and the same time and each receive identically the same instructions.

System of Remote Indication of Volume and Calorific Value of Gas.

Control Station Equipment.

The simple nature of the control desk is emphasized by the fact that the only equipment appearing on the desk consists of a numerical indicator and one lever switch and lamp for each station. The indicator takes the form of a number of digit drums somewhat similar in appearance to the usual "Veeder" counter. A few relays are housed in the body of the desk, but do not obstruct the usual drawer capacity. The control desk is operated from a trickle charged battery.

Excavation Work in Progress.

Laying Pipes at Low Lane, Masborough.

Rounding a bend by deflecting joints.

Equipment for each Producing Plant.

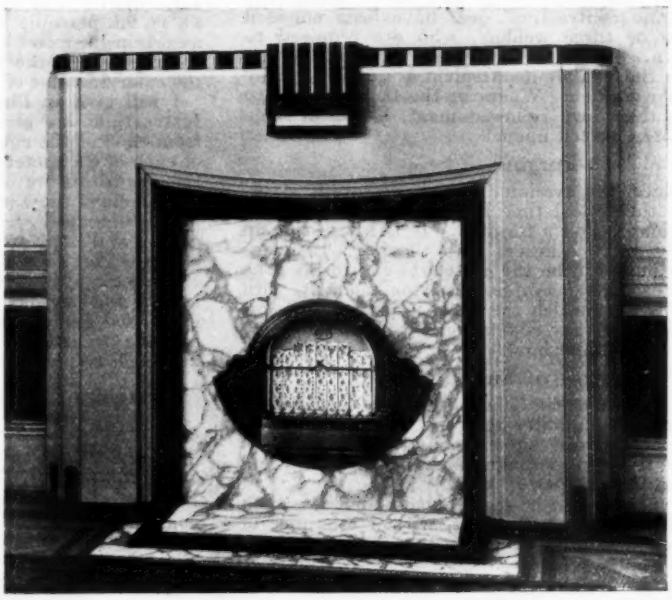
The equipment at each of the gas producing plants consists of a small cabinet. The cabinet is approximately 5 ft. 9 in. high, 2 ft. 9 in. wide, and 1 ft. 9 in. deep. It is operated from a battery which is trickle charged and is completely automatic so that it may be set in a position where there is not normally an assistant.

In order to couple up with the gas producing plant it has been necessary to do two things. One is to modify the existing counter on the gas meter so as to attach a pair of contacts which are closed once every time 1,000 c.ft. of gas passes through the meter, and the other is the insertion of two additional resistance thermometers in the existing calorimeter.

Method of Operation of Control Desk.

(1) *To obtain the reading of the volume and calorific value of the gas sent out by the producing stations.*

An indication from any station is obtained by throwing the lever switch associated with that par-



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ticular station in the direction marked "indication." The digit drums in the control desk indicator then revolve and display in the window of the indicator the volume and calorific value of the gas supplied by that station. When the lever switch is restored the digit drums return to their normal position.

(2) *To make a Telephone Call from the Control Desk.*

To make a telephone call from the control desk the lever switch associated with the desired station is thrown in the direction marked "telephone"—*i.e.*, in the direction opposite to "indication." The telephone bell at that station will immediately be rung. For the purpose of a conference call the switches associated with all the required stations are thrown in the direction marked "telephone," and these stations will then be called and connected to the instrument on the control desk. Telephone calls may be made and received while an indication is coming in from another station.

(3) *To make a Call from any of the Producing Stations.*

In order to call the control desk from any of the stations it is only necessary to lift the receiver of the telephone instrument at the station, and the control desk will be advised by means of an alarm bell and the lamp associated with the particular station. To answer the call the appropriate switch on the control desk is thrown in the direction marked "telephone."

Principles of Operation of the System.

It has already been explained that when a meter reading is required the lever switch on the control desk associated with the particular station is thrown in a given direction, and that when it is desired to make a telephone call to that station the same switch is thrown in the opposite direction. The effect of throwing this switch is to send an impulse over the line to the apparatus at the production station and the direction of that impulse depends upon which way the switch is thrown. This enables the apparatus at the producing stations to discriminate between a meter request and a telephone call.

Storage of the Indication.

Before proceeding further with the actual sending of an indication code let us consider the manner in which the readings of volume and calorific value are stored in the apparatus cabinet at the producing station. It has been mentioned that a contact (which is closed every time 1,000 c.ft. of gas passes through the meter) was added to the counter on the gas meter. The closing of this contact causes the first of a train of stepping switches to operate, and it will be seen that if these storage switches are lined up with the counter initially they will always remain in alignment. This synchronism is maintained at all times except when the reading is being sent to the control desk. These switches, which are similar to those normally used in automatic telephony, are used to "mark" a number of contacts which correspond to the digits of the volume reading, and it is from the position of such "marked" points that the indication code, sent to the control desk, is determined. It is essential, therefore, that the switches should not move during the sending of a code; at the same time the volume meter will still be functioning and may send several impulses in to the storage group during code sending. In order that these impulses shall not be lost an auxiliary counter switch is provided to which the impulses from the volume meter are routed during code sending. As soon as the code has been sent this auxiliary switch sets the storage switches forward to compensate for their stationary period, and normal operation is resumed.

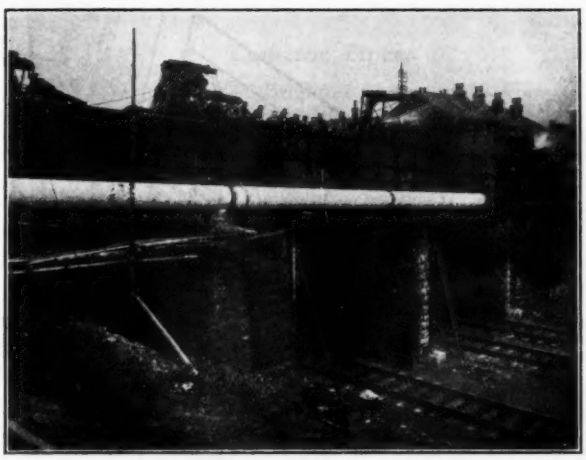
The two resistance thermometers already referred to are connected to a calorific value indicator mounted in the apparatus cabinet. This indicator carries an arm which moves over a large number of fixed contacts, and when a reading is requested from the control desk the arm is brought down by a magnet on to the contact which corresponds to the reading of the calorimeter at that instant. These contacts are connected to a bank of contacts on the stepping switch, and this switch, when an indication is requested, is caused to step round until it finds the contact on which the arm in the indicator is resting. The position of this switch is then such that as in the case of the volume indication it has "marked" points which determine the code which will be sent out.

Code Sending.

Let us suppose that the request for a meter reading has been sent to the producing station. This, it will be remembered, consisted of an impulse in a particular direction. The lines from the control desk are connected to two polarized relays in the apparatus cabinet, and the relay which operates is determined by the direction in which the impulse is sent; consequently, in the case which we are considering, the "indication" relay will be operated. This first causes the magnet in the calorific value indicator to bring the pointer down on the appropriate contact, and the associated switch then steps on to that point. The apparatus in the cabinet is now in the condition where points corresponding to the volume and calorific value are "marked" on the contact banks of a number of stepping switches. A sending switch the speed of which is controlled by a pendulum relay now comes into operation. This sending switch steps until it finds the first "marked" point, and the number of steps which it has taken is sent over the lines to the control desk and constitutes the first code which operates the units drum in the control desk indicator. By means of a distributor switch the stepping switch is then caused to find the other marked points in turn and codes corresponding to the remaining digits of the volume, and finally the three digits giving the calorific value are sent out. Although quite a large number of events take place the actual speed of operation is exceedingly fast, and the time required to receive and log the reading from any station is approximately 30 seconds.

Telephone Calls.

When the operator at the control desk initiates a telephone call the impulse sent over the line causes the "telephone" relay in the apparatus cabinet to operate but does not operate the "indication" relay. The operation



The 24-in Grid Main over the L.M.S. Railway at Brightside Station.

of this telephone relay causes a bell in the telephone instrument at the producing station to ring, and when the receiver of this instrument is lifted the telephone instrument is connected across the line and speech can take place. In order to originate a call from the producing station to the control station it is only necessary to lift the receiver of the telephone instrument at the producing station. This causes a short impulse of current to be sent over the line, but since no discrimination is required the direction of this impulse does not matter. The effect of this impulse is to cause a relay in the control desk to operate. This relay is associated with the particular line along which the impulse is sent and causes the lamp associated with that line to light, thus indicating to the desk operator which station wishes to talk to him. When he throws his associated switch to the position marked "telephone" the telephone instrument on the control desk is connected across that line.

The pumping of the syphons on the Grid involves travelling long distances. Two large capacity tank lorries are employed for this purpose. Great discretion was used in placing the syphons, especially where the main traversed private ground, in view of the fact that it might be difficult of access for the tank lorries when pumping. Therefore the gradients of the main were watched and figured out very carefully for this purpose. Most of the condensation takes place soon after the gas leaves the coke ovens, and therefore the largest syphons are placed in the immediate vicinity.

Standard Gas Tests.

With regard to the composition of the gas at the coke oven plants, we have installed an apparatus cabinet which is kept under lock and key. This cabinet contains ap-

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paratus for taking 24-hour samples of the gas through the various absorbents for naphthalene, ammonia, tar, sulphuretted hydrogen, and one average sample for complete analysis.

An Austin 7 h.p. motor has been equipped for the safe carrying of chemical apparatus, and is allotted to the use of the Central Laboratory. Every day our chemists are sent out to each of the coke oven plants to make spot tests, to collect the 24-hour samples from the previous day, and fix the apparatus with the new reagents for the following day's samples. At the same time they check over the calorimeter and remove the charts from the pressure and temperature recorders which we keep as checks on the recorders fixed to the meters. These also are kept under lock and key.

Specification of Gas to be Supplied Under the Agreement in the Sheffield Gas Act, 1931.

The gas shall not contain:

(1) Any tar as ascertained by the usual tests applied in ordinary gas-works practice.

(2) More than 2 grains of ammonia per 100 c.ft.

(3) More than 0·5% of oxygen.

(4) More than $\frac{40}{P}$ grains of naphthalene per 100 c.ft. of gas corrected to an atmospheric pressure of 30 in. mercury and a temperature of 60° F., where P is the absolute pressure measured in lbs. per sq. in. of the gas at the point of delivery.

(5) More than 1,000 grains of sulphuretted hydrogen per 100 c.ft.

(6) More than 9% of nitrogen.

Correction of Gas Volumes.

The crude gas sent from the various coke oven plants is measured at their works and the meters employed for the purpose are exclusively of the Connersville type, which have been found most reliable in use. These meters also are admirably suited to the methods which we employ in the remote indication of index readings already described.

In our Agreement with the coke oven owners it is stipulated that the volumes of gas passed shall be corrected to a temperature of 52° F. and a pressure of 4½ in. head of water.

Each Connersville meter is provided with special recorders which show pressure, volume, time, and temperature in distinct markings on the chart. As the chart is driven by a train of wheels from one of the impeller axles and not by a clock, the record of pressure and temperature is in exact ratio to the volume of gas passed; hence, by the use of a radial planimeter, their averages can be readily ascertained.

Special correction tables covering an extensive range of pressures and temperatures have been prepared by ourselves and issued to all coke ovens. These read direct in logarithms in order to reduce to a minimum all the necessary calculations.

As a check on the Connersville recorder charts, we have installed alongside each meter a set of Cambridge pressure and temperature recorders together with a single tube water pressure gauge and a Cambridge angle thermometer on the meter inlet pipe. The charts from the latter recorders are collected daily by the chemist who visits the coke ovens and are forwarded to the Engineer's office. Here they are averaged and the results are applied for the correction of the gas. Each month our corrected gas volumes are compared with those calculated by the coke oven staff from the Connersville charts, and so far the differences between the two sets of readings have been very small.

In accordance with our Acts the coke ovens may be visited by responsible officials of the Gas Company. This of necessity is frequently carried out, and the co-operation between the coke oven staff and my Company is of the best.

My Company's Gas Grid differs from that in operation in the Ruhr in that its main object is to collect surplus gas from coke ovens in close proximity to Sheffield, and convey to the city to distribute to the local industries. In other words, the outlet for the gas is almost wholly in the centre of the City of Sheffield, whereas in Germany the large consumers are spread over a wide area or are situated next to coke ovens. By the Act of 1931 my Company is allowed to lay collecting mains only through the area of supply of other gas undertakings, and cannot supply to any consumers within those areas without the local undertaking's consent.

By utilizing this surplus gas my Company have been able to reduce the price of gas to industrial consumers for large quantities to as low as 9½d. per 1,000 c.ft.

The total output of my Company at the present moment varies between 23 and 24 million c.ft. per diem, Saturday and Sunday excluded, and for this quantity 20 to 23 million c.ft. of coke oven gas is absorbed daily, with a reduction to about 50% at week-ends. The output of gas is fast increasing, and figures for this year point to a record.

During the War the Company had the largest output in its history, but this year the output is expected to be as great if not greater; and in view of the fact that during the War Sheffield was essentially an armament centre, I think that it is very creditable that, due to the strenuous efforts made by my Company during recent years to popularize gas at a cheap price, the gas consumed for the current year will be as high as, if not higher than, the peak period during the War.

To meet our requirements there has not been sufficient surplus gas available from the coke ovens to which we are already connected, and therefore we have been making coal gas and water gas at peak periods. There is therefore every indication that in the near future all the surplus coke oven gas available within the Company's limits will be readily absorbed, and it is highly probable that there will not be sufficient available.

In addition a small quantity of surplus gas is being taken intermittently from the United Steel Companies through the main which was already in existence. The cause for the interruption of the supply is due to the sudden increase in consumption at that Company's Steel Works, known as Messrs. Steel, Peech, & Tozer, Ltd., whom they supply direct with gas and which works are situated outside our area of supply.

Cast-Iron Pipes.

With regard to the Beighton Section, it is completely isolated at the moment from the remainder of the Grid.

Experience had been obtained with the Stanton-Wilson joint on the low-pressure distribution system, and after visiting the makers' works and observing various tests on sections of cast-iron mains embodying this joint at high pressures, it was decided to lay this section of the Grid, about 3½ miles, in cast-iron pipes utilizing the Stanton-Wilson joint.

There are, however, one or two other sections of this pipe line where the use of steel tubes was more desirable, one instance in particular, where the route crosses the London Midland and Scottish Railway line, presenting a very wide span. In this case as in every other where the pipes cross the railway lines smoke deflection plates have been clipped on the underside of the pipes to protect them from the exhaust of the locomotives.

This section of the pipe line joins the existing coke oven main leading from the Orgreave Coke Ovens to the Effingham Street Gas-Works, 3½ miles, and is 12 in. in diameter. From the point where this junction is effected to the Gas-Works in Sheffield is again 3½ miles, making the total distance between the ovens of the Sheffield Coal Company at Beighton to our Works 7 miles. From this junction the main contains a mixture of the two gases. The Woodhouse Gas-Works of the Sheffield Gas Company is supplied direct from the Orgreave main by a 6-in. steel branch, purification of this portion of the gas taking place at the Woodhouse Works.

Pressures.

It will be readily conceived that the pressure at which the coke ovens require to boost their respective gas into the trunk main depends entirely upon the quantity they themselves have to deliver in relation to the quantity and pressure that other coke ovens may be delivering into the trunk main, but whatever happens the pressure must not fall below 16 in. water gauge on entering my Company's Works.

The capacity of the mains as at present laid is far in excess of the quantity of gas being pumped through them, and therefore the initial pressures are comparatively low. At the moment I do not suppose there are any coke ovens pumping gas at a higher initial pressure into the Grid than 6 lbs. per sq. in., with the exception of perhaps the Sheffield Coal Company. As the trunk main proceeds farther out and more coke ovens are connected to it, the initial pressures of all concerned will naturally go up, but it is anticipated that no coke oven will be called upon to compress at more than 20 lbs. per sq. in. initial pressure.

A hearty vote of thanks was accorded to Mr. Halkett for his Address on the proposition of Mr. E. R. B. French (Leeds), seconded by Mr. B. Thorpe (Huddersfield).

British Sulphate of Ammonia Federation, Ltd.

Annual Report for 1933-34

The following extracts are from the Fourteenth Annual Report of the Federation, covering the 37th year of propaganda work undertaken successively by the Sulphate of Ammonia Committee, the Association, the Federation, Nitram, Ltd., and Imperial Chemical Industries, Ltd.

The following figures are offered as fair estimates of the world's production and consumption of fixed nitrogen, but strict accuracy is not claimed for them. The estimates for 1932-33 have been slightly revised. The percentage increases or decreases as compared with the previous year are shown in italics.

World Production and Consumption of Pure Nitrogen for the Fertilizer Years

[In Metric Tons.]

	1931-32.	1932-33.	1933-34.
Production—			
Sulphate of ammonia—			
Bye-product	301,655	257,719	305,953
Synthetic	522,207	559,984	540,279
	823,862	817,703	846,232
Cyanamide	134,604	168,495	192,442
Nitrate of lime	78,939	118,241	105,997
Other forms of nitrogen*—			
Synthetic	347,812	462,060	511,865
Bye-product	29,970	39,560	45,040
Chile nitrate	170,000	70,800	85,200
Total production	1,585,217	1,676,859	1,786,776
Percentage increase or decrease	*– 6·5*	*+ 5·8*	*+ 6·55*
Consumption—			
Manufactured nitrogen	1,417,126	1,619,705	1,700,907
Chile nitrate	138,208	127,242	161,199
Total consumption	1,555,334	1,746,947	1,862,106
Percentage increase or decrease	*– 4·1*	*+ 12·3*	*+ 6·6*
Agricultural consumption about	1,412,000	1,586,000	1,663,000
Percentage increase or decrease	*– 3·0*	*+ 12·3*	*+ 4·85*

* Including nitrogen products used for industrial purposes (except Chile nitrate) and ammonia in mixed fertilizers.

NOTE.—Fertilizers are included in these tables under the final form as sold, so that, for example, cyanamide if converted into sulphate of ammonia is included under synthetic sulphate of ammonia, or, if into ammophos, is included under other synthetic nitrogen.

During the year under review it is estimated that there was an increase of 109,917 metric tons of nitrogen, or about 6·55%, in the actual production of the forms of nitrogen enumerated above. The production in Chile increased by 14,400 tons, or over 20% (following a decline of about 58% in the previous year), and output in other countries increased by 95,517 tons, or 6%. The output of bye-product nitrogen has increased by 18%. More than half of this improvement is due to the U.S.A.

While production thus shows an improvement, synthetic nitrogen plants have on an average operated at less than 41% of capacity during the year. The world capacity for synthetic nitrogen, including cyanamide, is estimated at 3,310,000 tons of nitrogen.

The total consumption increased by 115,159 tons, or about 6·6%, following an increase of 12·3% last year.

The increase in fertilizer nitrogen consumption was 77,000 metric tons, or 4·85%, as compared with 12·3% in the previous year. Each main class of fertilizer showed an increase except ammonium sulphate (including ammonia for mixed fertilizers), which declined by 36,445 tons of nitrogen, or 4·2%, from its 1932-33 record figure.

In individual countries, the largest tonnage increases in nitrogen consumption have been in the U.S.A., Germany, Italy, Russia, and Egypt, and the greatest decrease in China.

The development in recent years of production and consumption of "other synthetic nitrogen fertilizers," particularly of lime ammonium nitrate forms, has been remarkable. Sulphate of ammonia has, however, been able to maintain and in some years to increase its proportion of the total world fertilizer nitrogen consumption by virtue of its well-established economy and efficiency.

While the continuation of the agreements with the most important continental nitrogen producers had a steadying effect on the market and resulted in members of the Federation receiving a slightly higher price for their output than in 1932-33, the absence of a definite agreement with the Chilean interests led to price cutting in some markets. In this respect, the prospects for 1934-35 are more encouraging, as not only have the agreements with the Continental producers been renewed and an arrangement arrived at with Japanese ammonium sulphate producers, but a definite agreement has also been concluded with the Chile nitrate industry. These arrangements should provide a more stable price structure.

Home Production.

The figures in the following table showing the total production of ammonia products, expressed as sulphate, are calculated on the basis of 25% ammonia (about 20·6% nitrogen). The figures for sulphate of ammonia production and trade, however, apply to actual tons of product with a nitrogen content of about 21%.

Production of Ammonia Products and of Ammonium Sulphate in Great Britain and Ireland and Channel Islands.

[Tons of 2,240 lbs.]

Calendar Year.	Total Production of Ammonia Products, Expressed as Sulphate of Ammonia Equivalent (Basis 25% Ammonia).*				Included in the Total.	
	England and Wales.	Scotland.	Ireland.	Total Great Britain and Ireland.	Industrial Ammonia Products (Basis 25% Ammonia)†	Sulphate of Ammonia as such (Actual Tons of Product).
1931. .	595,031	54,311	3,977†	653,319	86,156	524,651
1932. .	726,253	42,121	3,106†	771,480	85,505	628,349
1933. .	647,149	41,669	3,857†	692,675	94,361	574,743

* 25% ammonia = 20·6% of nitrogen (approx.). The figures for total production of ammonia products are recalculated from the Alkali Inspectors' Reports, except for the estimates shown.
† Estimated.

Home agricultural consumption of sulphate of ammonia showed a decrease on the 1932-33 figures of 27,924 tons, or 12%. The decline in home deliveries against sales was larger, but the 9,500 tons, mentioned in last year's Report, which were delivered to merchants and mixers in the last six weeks of 1932-33, in excess of normal requirements at that time, were consumed in 1933-34.

As will be seen from the table, the decline in consumption affected all three parts of the home market, but was greatest, proportionally, in England and Wales. About half of the decline in sulphate was counter-balanced by an increase in the agricultural use of other nitrogen fertilizers. This exchange was partly due to the raising of the sulphate price (from the abnormally low level reached under the stress of foreign competition in 1932-33) accompanied by a slight reduction in nitrate prices. Foreign imports amounted to 1,666 tons, against 226 tons in 1932-33, 1,500 tons coming from Canada.

The total consumption of pure nitrogen in the British Isles for all purposes amounted to about 76,200 metric tons against 75,600 tons last year. The tonnage used in industry is estimated at 20,400 tons, against 17,300 last year.

The detailed figures for sulphate of ammonia are as follows:

N.B.—The total consumption of Chile nitrate is estimated at 25,300 tons as against 21,700 tons for last season.

Great Britain and Ireland and Channel Islands.

[Tons of 2,240 lbs.]

Fertilizer Year.*	Total Production of Sulphate of Ammonia as such.	Agricultural Consumption of Sulphate of Ammonia in —				Agricultural Consumption of Chile Nitrate.†	Sulphate of Ammonia.	
		England, Wales, and Channel Islands.	Scotland.	Ireland.	Total British Isles and Channel Islands.		Exports from—	Imports into—
							Great Britain and Ireland other than to or from the Channel Islands.	
1931–32	600,204	133,583	49,983	44,772	228,338	33,000	375,757	14,187
1932–33	599,128	150,704	51,570	36,369	238,643	20,000	335,173	226
1933–34	508,463	129,532	47,970	33,217	210,719	22,000	301,460	1,666

* From 1913-14—1927-28, years ended May 31. From 1928-29 on, years ended June 30.
† Estimated.

Exports.

Total exports from Great Britain and Ireland show a decrease of 33,831 tons, or about 10% on last year's figures, but during the year there has been a further reduction in the stocks on hand in our export markets.

The following figures show the shipments to the principal markets:

—	1931-32.	1932-33.	1933-34.
Spain, Portugal, Canaries	184,167	137,570	114,585
Japan	52,159	3,000	64,315
China and Hong Kong	44,314	59,817	13,441
West Indies, British Guiana, and Mauritius	22,859	30,952	22,534
India and Ceylon	35,421	48,771	51,274
Australia and New Zealand	9,498	25,869	13,285

Shipments to Japan recovered to their former level. Although Japan and Korea exported about 80,000 tons in the early part of the year 1933-34, contrary to expectation, they were not yet self-sufficing.

Propaganda Work.

As regards sulphate of ammonia, the outstanding feature of the period under review was the successful establishment of a scale of prices based on a spring price of £7 5s. as compared with £6 10s. and £5 5s. for the two previous years. It was inevitable that an increased price should arouse some unfavourable comment from the consumer, and much of our propaganda activity has been devoted to convincing the agricultural world that the price charged, although representing an increase of 38% above the lowest level, was no more than fair and reasonable, bearing in mind the entirely uneconomic level to which prices had previously sunk under the stress of foreign competition.

In the circumstances the volume of home sales cannot be regarded as unsatisfactory, bearing in mind that there was an exceptionally heavy carry-over of stocks in merchants' hands, and also that the actual financial position of the farmer showed but little improvement, apart from the benefits of the Wheat Subsidy.

There are undoubtedly, however, more hopeful prospects before British agriculture, and a feeling of greater confidence is generally abroad in those branches which have begun to organize their production and marketing.

Membership.

At June 30, 1934, seven producing members of the Federation resigned; their combined output for the fertilizer year 1933-34 represented 1·29% of the total output of the members. An important new producer joined the Federation and one former member, on resuming production, has rejoined. As at July 1, 1934, the Federation numbered 211 members, who continue in the current quadrennial period.

The Work of an Industrial Centre

The following is the report of the discussion on Mr. W. Dieterichs' Paper before the Southern Association of Gas Engineers and Managers at their Autumn General Meeting in London on Nov. 30, 1934.

The PRESIDENT (Mr. Stephen Lacey, of the Gas Light and Coke Company), in opening the discussion, remarked that the paper was full of material and absolutely first hand, being entirely based upon personal experience—and an exceptionally wide experience. His Company, he said, played its part in the Centre Scheme, having been developing along those lines for a number of years before the Centre Scheme actually came into being. That section of Watson House occupied by Mr. Dieterichs and his small but expert staff had been the Centre for the Gas Light and Coke Company for the past few years, serving an area sufficiently large to justify its being called a Regional Area. In the Gas Light and Coke Company's area of supply there were more than 14,000 factories, including almost every kind of heating process with the exception of the heavy industries, such as iron and steel work. Mr. Dieterichs and his staff worked in conjunction with a considerably larger staff of industrial representatives, whose primary business was to keep in touch with the factory managers and make themselves familiar with all the problems appertaining to the industrial applications of gas. Furthermore, at Watson House they specially designed appliances for particular requirements. It was the industrial representatives' work, as it was the salesmen's also, to look after large kitchen installations and the cookery trade generally. There was a tendency for these specialists to increase.

The whole success of the scheme turned very largely upon the co-operation between the technical salesmen who were in touch with the customer day by day and Watson House. The Centre could only give really effective assistance to the subscribing undertakings who did the ground work for themselves—that was to say, the individual undertakings must send to the Centre the fullest possible details of the problems on which they required assistance. This was so essential to the success of the Centre Scheme that Mr. Lacey made no apology for repeating it. He realized that many of the smaller undertakings had not the potential industrial load to justify the employment of a technical representative with the right qualifications; but where the engineer had taken the matter in hand surprising results had been achieved. An outstanding example of this was to be found at Stretford, where Colonel Carr had made the industrial load his special study; and, after all, who was better qualified than the gas engineer to deal with heat treatment work? He could also arrive at an accurate system of charging for gas for each particular process—which was a very important point.

Mr. Lacey entirely endorsed Mr. Dieterichs' remarks in regard to working with, and not against, the manufacturers of gas appliances. He remembered discussing this question with Mr. Dieterichs seven years ago when he took charge of their industrial demonstration rooms and workshops. Up to that time they had been running the risk of losing the goodwill of the manufacturers by under-selling them. They decided that it was their proper job to undertake pioneer work with the manufacturers, who had no financial interest in the gas appliance once it was installed. So they encouraged the manufacturers to get up-to-date with gas and keep up-to-date with gas both as regards thermal efficiency and equipment. Their principle was that when they had broken fresh ground and designed a new appliance they got the manufacturers to make it and sell it as soon as there was a sufficient market. Their experience showed them that this policy was the right one. The value of the work that Mr. Dieterichs did at Watson House, said Mr. Lacey in conclusion, had increased sixfold in the last six or seven years.

Mr. S. B. CHANDLER (Tottenham) congratulated Mr. Dieterichs on his paper, which was full of exceptionally interesting points. This subject was one in which the whole Industry must take a very keen interest in the future. The gravitation of factories from the north to the south of the country was opening up fresh problems for London and the surrounding districts. The construction of arterial roads had provided new frontages which had been taken over by factories. In his own Company's area along the Cambridge road new factories were springing up in all directions, and accordingly they were paying considerable attention to this aspect. They must commend Mr. Dieterichs' section for the extreme efficiency with which the various subjects were dealt with; and he was particularly interested in the remarks regarding co-operation with the manufacturers. Some manufacturers fell behind a little in regard to furnace design, and they left it as an open question as to what fuels the apparatus utilized, for their only interest was in the sale of the appliance. The Gas Light and Coke Company were pioneers in realizing the position and tackling it in the way that the Paper had shown. So far as Tottenham was concerned, the relations between their own industrial section and Mr. Dieterichs' section had been of the happiest, and the Tottenham Company had found them of great service in the solution of many of their problems. One particular problem was very efficiently solved by the application of the "Thermspray" boiler. The whole Industry, added Mr. Chandler in conclusion, appreciated the formation of these Centres as a means of overcoming the very severe competition which they would have to face.

Mr. C. F. BOTLEY (Hastings) observed that he came from what might be termed a "non-industrial" district; but it was nevertheless surprising how many applications there were for gas in such an area which might almost be regarded as industrial. He was sorry that there was no such assistance available in the past. He had been thinking of one or two experiences of his own with consumers with whom he had succeeded and others with whom he had not. He had been called upon to design many kinds of plant in circumstances when he would have been greatly helped—and would have succeeded when he might have failed—by referring the matter to the Industrial Centre. He was entirely desirous of associating himself with the manufacturers; but they had not always been successful when they had called in the assistance of the manufacturers. He recalled the case of a pastry oven with which difficulty was being experienced. The people who had supplied the oven were asked by the users to make the oven do what was claimed for it, but he was sorry to say they failed, while the Gas Company in their small way had succeeded in giving satisfaction to the user. Indeed, so successful were they in this particular instance that they were asked to alter other ovens in different towns where they existed.

The question of price, continued Mr. Botley, was very important. Mr. Dieterichs had suggested that they should all give a list of the prices they charged for various jobs; but he must dissent from this suggestion. For he thought it very im-

prudent for small undertakings, such as his own, to do so. They adopted a contract system under which he was pleased to be able to quote prices which would compare favourably with any other fuel for the same purpose; but he could not advertise that price from one end of the country to the other. So he hoped that this suggestion would be used with a great deal of care. He had been trying very hard to obtain the baking load in Hastings, and he was prepared to offer terms which would compete with any other form of fuel in the town. Such a price might not necessarily be a commercial one, but if one adopted a contract price one could successfully meet almost every situation.

Mr. Botley went on to say that a firm of builders in Hastings were anxious to equip some bedrooms with fires. This firm were friendlily disposed towards the Gas Undertaking, but their electrical competitors had more convenient appliances in that they did not require flues. The result had been that panel electric fires had been installed at a price of about 24s. each. An enterprising electric firm had produced a fire to fit across a corner of the room, and now Mr. Botley said he had the problem of substituting a gas heater in that corner at a cost of 24s. In conclusion, he emphasized that it was absolutely essential for every Industrial Centre to be attached to a large gas undertaking; it was no use their establishing Centres in connection with small undertakings. And they could all play their part in contributing to this great work if they availed themselves of the development which was taking place.

Mr. H. C. Smith (Tottenham) also thanked Mr. Dieterichs for his paper, remarking that he had had the advantage of seeing something of the work which was being carried on at Watson House, which was excellent in every way and most valuable to the whole Industry. He supported Mr. Dieterichs in his suggestion that they should not take work out of the manufacturers' hands. There was a great temptation, he knew, where they had set up their own industrial development shops to get them interested in the jobs that the undertaking wanted to advance, and to carry through the whole thing regardless of the fact that some manufacturer might have been able to do the same thing. Their own shops and development centres could do invaluable work in initiating new uses for gas and new apparatus; but at the earliest possible moment they should get a reputable manufacturer interested in the appliance they had in mind. They could now go to their Industrial Centre, thereby saving an enormous amount of time in doing experiments which had already been solved.

There was not a single gas undertaking, he was sure, which had not some form of potential industrial load. In his own experience, before oil competition became keen they had a few industrial users of gas; but they decided that it was time to set up an industrial department, and they were surprised to find the number of potential industrial users tucked away on their district. This had been particularly marked in some of the country areas they had taken over recently. He had no hesitation in saying that there was not a single gas undertaking which had not an industrial load somewhere if they could only find it.

The question of price, went on Mr. Smith, obviously had an important bearing on the subject of selling industrial appliances; but Mr. Dieterichs had rightly only dealt in his Paper with Industrial Centres. He suggested that Mr. Dieterichs should tell them—who were affiliated to his Centre—at what price they must sell gas to compete with other fuels for various processes. This would help many of them very much in many ways. They must be able to go to their Boards and point out that they had a good chance of obtaining a certain load, but that there would be no chance at all of getting it unless they were prepared to sell gas at so much per therm. Therefore, if it were possible for the Industrial Centres to tell them this it would overcome many of their difficulties. As had already been pointed out, Colonel Carr had set out to persuade industrial users at Stretford that their processes could be carried out more economically by gas than by other fuels; but, in addition to that, he had been able to sell gas at a very low price. There might be many other undertakings which were willing to give all the service but could not possibly sell gas at the price Colonel Carr could. Therefore price had a most important bearing on this industrial load business, and if they could be told at what price they must be prepared to sell gas for certain applications it would enable them to get more business.

Mr. J. C. Hosken (Secretary of the Technical Sub-Committee of the Joint Co-ordinating Committee of the Industrial and Commercial Uses of Gas) said that Mr. Dieterichs was one of the real driving forces behind the Industrial Centre, and they were fortunate in having such a capable and imperturbable man there.

(*Continued on page 45.*)

Patent Specifications

Conveyor Lubrication.—No. 419,480.

No. 29,538. Oct. 25, 1933.

West, F. J., West, E., and West's Gas Improvement Company, Ltd., of Manchester.

Fig. 1 is a front elevation of a grease gun equipment for a conveyor and fig. 2 a part end elevation and part sectional end elevation of the equipment constructed in one convenient form in accordance with this invention.

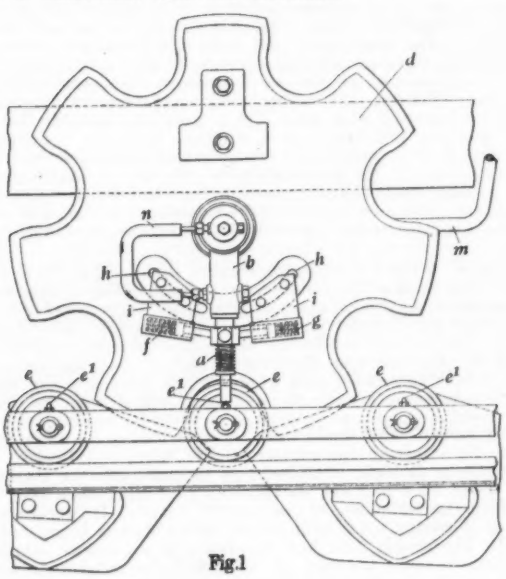


Fig.1

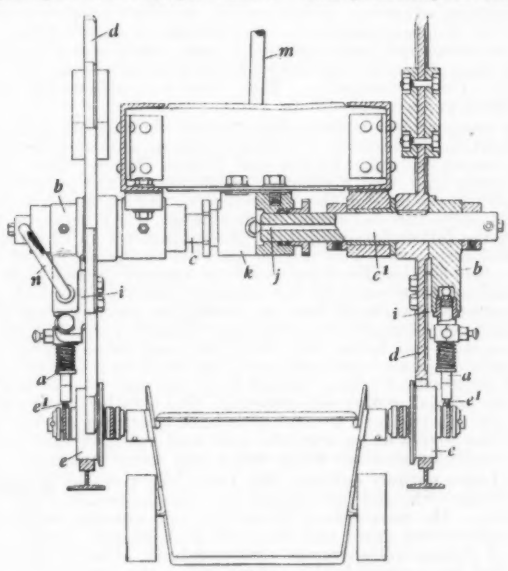


Fig.2

Each grease gun fitting *a* is supported freely by means of an eye piece *b* upon the spindle *c* with which its sprocket wheel *d* (which engages the runner wheels *e*) rotates, and such fitting *a* is returned to its central position to engage a nipple e^1 upon a runner wheel spindle, by means of spring buffers *f* and *g* at its opposite sides. The buffers are mounted upon the side face of the sprocket wheel *d* and are adjustable thereon by bolts and long curved slots *h*, which form the means of connection of the parts *i* (carrying the springs) to the sprocket wheel. The complete spindle carrying the two sprocket wheels *d* and grease gun fitting is made in two parts *c*, c^1, each of which has an axial passage *j* therethrough for the passage of the grease from a central gland connection *k* which receives the grease from a tube or pipe *m*. The container to each grease gun from its spindle *c* or c^1 is by way of a flexible tube *n* which will allow of movement of the grease gun fitting relatively to the spindle and sprocket wheel, when such fitting is in engagement with a nipple upon the conveyor chain. This possibility of relative movement enables the grease gun to remain in contact with a nipple for a prolonged period.

The patentees claim that, with this improvement, they simplify and cheapen the construction of the lubricator while ensuring its efficiency for the desired purpose. The grease guns may be of the type with a non-return valve for cutting off communication with the grease supply during the delivery stroke of the gun.

In spite of the weight he carried he had remarkably little inertia! He got remarkably quickly off the mark. They found many undertakings who had not had experience of the working of the Centre sending in vaguely worded conundrums and thinking they could get the necessary answer out of the machine merely by turning the handle. But they could not get out what they did not put in; and it was up to each undertaking to put the information they sent up in a form which would be useful to other people.

In regard to the manufacturers, two out of every three of them regarded gas undertakings as their natural enemies and looked upon them entirely in the light of competitors. But gas undertakings really did want to get over this antagonism and co-operate with them.

Mr. S. E. WHITEHEAD (Southampton) inquired if, when special designs for apparatus were handed over to manufacturers, the Gas Light and Coke Company granted an exclusive licence to the maker or a non-exclusive one.

The Author's Reply.

Mr. DIETERICHS, replying to the discussion, said that he would like to take this opportunity of thanking Mr. Lloyd and his colleagues for their assistance and criticism which they had given him in the preparation of his paper, and said that although his name had been mentioned several times he would not like to convey the impression that any developments were other than the result of the co-operative efforts of his Section. Mr. Dieterichs also thanked the speakers for their remarks and criticisms, which he thought were all more or less on the same lines.

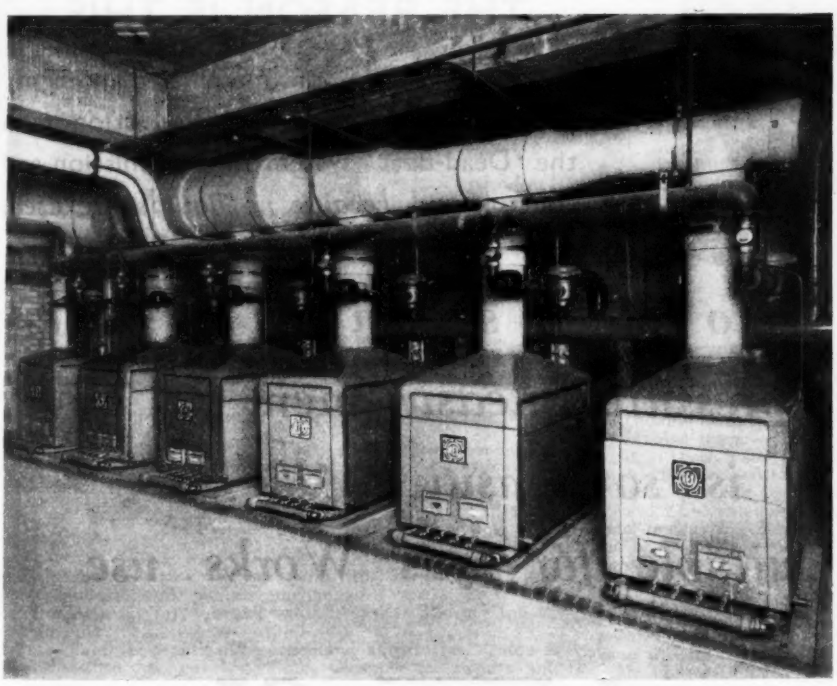
In dealing with manufacturers, he thought that a friendly finger placed on the point where they had gone wrong was much better than hostile criticism. If a manufacturer did something which they knew to be wrong and they criticized him unnecessarily, he would not feel well disposed towards the Industry, and he would quite likely turn his attention to other fuels where he would perhaps receive more assistance from the organization behind them. It was only by a thorough understanding between gas undertakings and manufacturers that they would be successful.

Mr. Dieterichs stated that Mr. Botley raised a point which needed very careful thought, but it must be remembered that the manufacturers were often dealing with the gas undertakings' consumers, and in most cases they were not even aware that the gas undertaking was prepared to consider a special price and they accepted the cost per therm given them by their customer, whereas with solid fuel and oil the prices were well known throughout the country. Reference had been made to a point regarding the economic price of gas for bread-baking, which he had purposely avoided, as the Technical Sub-Committee had already received approval from the Joint Co-ordinating Committee to circulate the findings of the Committee to the subscribing undertakings, but this information was being withheld until a decision had been arrived at regarding central heating. He went on to say that when the centre scheme started they were up against the bread-baking problem throughout the country, particularly in the south, where 90% of the baking was done in what was known as a side flue oven, which was nothing more than a brick box with a hole in the side for the firebox. There were one or two cases in which it was possible to use coke in lieu of coal or oil, but if any constructional alterations were necessary it would bring in many complications to improve the thermal efficiency, and it invariably meant that the local authorities would compel the baker to build a ground level bakehouse so that in most cases the baker would not be prepared to have the necessary constructional alterations made, and there was little chance of moving the side flue oven for some years to come. They were up against an oven where it was not possible to make any appreciable increase in the thermal efficiency when burning gas; therefore the price per therm for gas must be lowered to compete with solid fuel and oil which was being used at the present moment. They could not hope to compete with these fuels with gas at 1s. per therm, which was being asked for by some of the undertakings throughout the country. From recent tests it was found that in special cases, although the cost of coal per therm was considerably lower than that of gas, it was possible to bake a sack of bread with gas at a figure which most bakers were prepared to accept in view of the cleanliness, flexibility, and adaptability of gas, although the ovens on which the tests were carried out were inefficient from a coal burning point of view, and no doubt could be improved to the disadvantage of gas.

With reference to Mr. Whitehead's remark, Mr. Dieterichs said that when considering the licence for manufacturers the Company took the view that if they had developed a certain appliance it would be unfair to give it to one manufacturer only. As a general rule, therefore, unless the market was very limited, or for some special reason, a sole licence was not desirable.

The PRESIDENT, in proposing a hearty vote of thanks to Mr. Dieterichs, remarked that this question of sole licence depended entirely upon the circumstances. If an apparatus was in common use they would be unnecessarily restricting its sale by giving it an exclusive licence. Sometimes, however, they gave an exclusive licence for a limited period.

HOT WATER SUPPLY AND HEATING PROBLEMS



The success of "REX" Boilers for large and small Central Heating Installations indicates how gas-minded many Architects and others in responsible positions are becoming, this illustration showing the Boiler Plant for Central Heating and Indirect Hot Water Supply in a modern building in South London, where an output of approximately 3,000,000 B.Th.U. per hour is needed for the full winter load.

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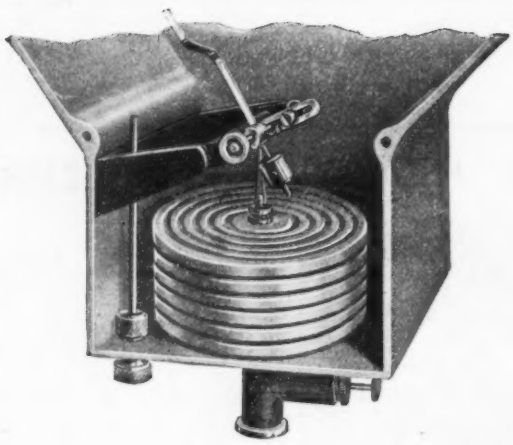

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Gas Markets and Manufactures

Stock Market Report.

[For Stock and Share List, see later page.]

The Stock Exchange did not entirely shake off the holiday influence last week, and in the absence of buyers business was only of moderate proportions. The turnover, however, was sufficient to indicate that the strong tone which characterized markets during the few weeks before Christmas still remains, and after the New Year's holiday (the Stock Exchange closes on Jan. 1) a return to more active conditions is anticipated.

The Gas market was by no means neglected during the few days of business, and prices continued firm, though with the exception of South Shields consolidated, which was marked up 2 to 187 on the Newcastle Exchange, no quotations were altered. Some high prices were recorded in London among several of those stocks not officially quoted—*e.g.*, Brighton and Hove 5% debenture changed hands at 130¼; and Derby consolidated (8½% dividend) at 204½. The Liverpool new 3¼% debenture (1964), which has recently been placed on the market at 96½, sold for 99⅔; at the time of writing £5,000 of this stock is available in London at par, free of expense, thus giving a full 3¼% yield.

There are very few debenture stocks on offer at the present time, though there is a plentiful supply of practically all the leading ordinary and preference stocks, including £135,000 of the South Suburban new 4% preference stock which is offered at 108 free of expense, giving a return of £3 14s.%; six months' dividend to June 30 next will be paid on July 31.

It will be seen that the Stock and Share List this week contains a record of the lowest and highest prices of transactions marked during the year 1934, exclusive of prices for special bargains. An important fact is that with the majority of stocks the highest price corresponds with the current quotation, which is attributable to the widespread demand for this class of security, especially during the latter part of the year. The margins are in many cases considerable, most of the popular stocks being round about 20 points up on the lowest prices, while Bournemouth sliding-scale heads the list with a margin of 34 points.

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *Dec.* 31.

The prices of tar products remain steady at about the following levels:

Pitch, 48s. to 49s. per ton f.o.b. Creosote is in demand and price is on the up-grade. To-day's value is not less than 5d.

Refined tar, 4d. to 4¼d. per gallon in bulk at makers' works.

Pure toluole, about 2s. 2d.; pure benzole, 1s. 9d. to 1s. 10d.; 95/160 solvent naphtha, 1s. 7d.; and 90/160 pyridine, 6s. 3d. to 6s. 6d.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Dec. 31.

The average prices of gas-works products during the week were: Gas-works tar, 21s. 6d. to 26s. 6d. Pitch—East Coast, 47s. 6d. to 50s. f.o.b. West Coast—Manchester, Liverpool, Clyde, 47s. 6d. to 50s.* Toluole, naked, North, 1s. 6d. to 1s. 8d. Coal-tar crude naphtha, in bulk, North, 6½d. to 6¾d. Solvent naphtha, naked, North, 1s. 4d. to 1s. 4½d. Heavy naphtha, North, 9¾d. to 10¾d. Creosote, *ex* works, in bulk, North, liquid and salty, 3½d. to 3⅝d.; low gravity, 3½d. to 3⅝d.; Scotland, 3⅝d. to 3¾d. Heavy oils in bulk, North, 3¾d. to 4¼d. Carbolic acid, 60's, 1s. 8d. to 1s. 9d. Naphthalene, £10 to £11. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, Dec. 29.

The market remains lifeless owing to the holidays, and makers' quotations are mainly unchanged.

Crude gas-works tar.—Actual value is 29s. to 31s. per ton *ex* works in bulk.

Pitch.—There is practically no demand at present. Value is easy at 43s. to 44s. per ton, f.o.b. Glasgow for export and 42s. 6d. per ton *ex* works in bulk for home business.

Refined tar.—It is doubtful if value can be maintained at present level of 3d. to 3¼d. per gallon, f.o.r. naked.

Creosote oil.—Quotations are steady. B.E.S.A. Specification. 3⅝d. to 4d. per gallon; low gravity, 4⅛d. to 4½d. per gallon; and neutral oil, 4d. to 4¼d. per gallon; all f.o.r. in bulk.

Cresylic acid.—Conditions are quiet. Pale, 97/99%, is 1s. 2½d. to 1s. 3½d. per gallon; dark, 97/99%, 1s. 0½d. to 1s. 1½d. per gallon; and pale, 99/100%, 1s. 4d. to 1s. 5d. per gallon; all *ex* works.

Crude naphtha is valued at 4½d. to 5d. per gallon, f.o.r. according to quality and district.

Solvent naphtha.—90/160 grade is 1s. 3d. to 1s. 4d. per gallon and 90/190 heavy is about 9d. per gallon.

Motor benzole is more plentiful at 1s. 3d. to 1s. 4d. per gallon.

Pyridine.—90/160 grade is 6s. to 6s. 6d. per gallon, and 90/140 grade 6s. 6d. to 7s. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s.	d.		s.	d.	
Crude benzole . . .	0	9	to	0	9½	per gallon at works
Motor ,, . . .	1	3½	,,	1	4	,, ,, ,,
90% ,, . . .	1	4	,,	1	4½	,, ,, ,,
Pure ,, . . .	1	7½	,,	1	8	,, ,, ,,

Contracts Advertised To-Day.

Coal.
Spenborough Gas Department. [p. 52.]

Condensers.
Spenborough Gas Department. [p. 52.]

Cookers.
Halifax Gas Department. [p. 52.]

Retorts, Vertical.
Buxton Gas Department. [p. 52.]

Valves and Connections.
Stockport Gas Department. [p. 52.]

Trade Notes.

Centrifugal Casting of Pipes.

Cochranes (Middlesbro') Foundry, Ltd., have sub-licensed the Stanton Ironworks Company, Ltd., near Nottingham, to use the "Mairy" patent process in connection with centrifugal casting of pipes. Cochranes acquired some years ago from Belgium the sole British rights for the use of this process.

Diaries, Calendars, &c.

Further seasonable gifts in the form of diaries, calendars, &c., have been received from the undermentioned friends, whose good wishes are heartily reciprocated:

Brotherton & Co., Ltd., City Chambers, Leeds.
Davison & Partner, Ltd., Carteret Street, S.W. 1.
R. & J. Dempster, Ltd., Manchester.
Dougall's Gas Meters, Ltd., Chiswick Mall, W. 4.
Gas Purification and Chemical Company, Ltd., Old Broad Street, E.C. 2.
Mavor & Coulson, Ltd., Broad Street, Glasgow.
Simon-Carves, Ltd., Cheadle Heath, Stockport.
Stanton Ironworks Company, Ltd., nr. Nottingham.

Gas *v.* Electric Lighting at Becontree.

At a meeting of the London County Council on Dec. 18 Mr. H. R. SELLEY, J.P., M.P. (Immediate Past-Chairman of the Housing Committee), moved the reference back of the Report of the Housing and Public Health Committee on the ground that he thought it quite unnecessary at this juncture for the Council to involve itself in the expenditure of £118,750 to put electric light in those houses already supplied with gas. The sum would enable the Council to build three hundred houses.

Lieut.-Col. Sir CECIL LEVITA, K.C.V.O., C.B.E., D.L., J.P., a former Chairman of the Housing Committee, seconded the reference back. The Report, in his opinion, revealed a squandering of the ratepayers' money. The cottages were perfectly well lighted and well supplied with gas. He could see no reason why the Council should suddenly be told that they should put in a dual system, and should add electricity to the good gas system which already existed. He considered the present proposal a luxury which would cost the Council a great deal more than was mentioned.

Mr. LEWIS SILKIN (Chairman of the Housing and Public Health Committee) said it had been the policy of the Housing Committee to substitute, where it could, electric light for gas light. They had to make progress, and as commercial men they had to provide houses which would meet the reasonable demands of their tenants.

On a show of hands the recommendation of the Committee was carried.

A year of progress for West's carbonizing and fuel-handling systems . . .

During 1934 installations of Glover-West vertical retorts have been put into commission at Lurgan, Ireland (a second and a third installation), Worcester, Macclesfield (third contract), East Hull and Hawick, Scotland, and an installation of Westvertical carbonizing chambers is in operation at Tilburg, Holland.

New contracts for Glover-West vertical retort installations, with their nominal daily gas-making capacities, are as follows:—Bilston (1,080,000 c. ft.); Falkirk (second contract—720,000 c. ft.); Leicester (sixth contract—2,400,000 c. ft.); Limerick (second contract—150,000 c. ft.); Llanelly (720,000 c. ft.); St. Helens (fourth contract—3,240,000 c. ft.); Stratford-on-Avon (720,000 c. ft.); Johannesburg, S. Africa (second contract—1,350,000 c. ft.); Bourg-en-Bresse, France (480,000 c. ft.); Vannes, France (second contract—240,000 c. ft.); Roskilde, Denmark (second contract—150,000 c. ft.); Reus, Spain (375,000 c. ft.); and Santiago, Chile (third contract—1,920,000 c. ft.).

Installations of Westvertical carbonizing chambers are in hand for the gas undertakings of St. Albans (nearly four million c. ft. per day); Willenhall (600,000 c. ft. per day); and North Shore, Sydney, N.S.W. (nearly three million c. ft. per day).

WEST'S GAS IMPROVEMENT CO., LTD.

LONDON: REGENT HOUSE, KINGSWAY, LONDON, W.C. 2.
Telephone: Holborn 4108.
Telegrams: "IMVERTRET, WESTCENT"

MANCHESTER: MILES PLATTING, MANCHESTER, 10.
Telephone: COLLYHURST 2961.
Telegrams: "STOKER, MANCHESTER"

STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

Issue. £	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Dec. 28.	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Year 1934 (h).
1,551,868	Stk.	Sept. 10	7	7	Alliance & Dublin Ord. ...	135–145	...	130–141½
374,000	"	Dec. 17	4	4	Do. 4 p.c. Deb. ...	90–100*	...	94½–98
557,655	"	Aug. 13	7	7	Barnet Ord. 7 p.c.	168–178	...	167–174½
300,000	1	Oct. 8	1/9½	1/4½	Bombay, Ltd.	1⅞–1⅝	...	27/–31/6
178,480	Stk.	Aug. 13	9½	9½	Bournemouth sliding scale	227–237	...	202–236
550,050	"	"	7	7	Do. 7 p.c. max. ...	170–175	...	164–175
439,160	"	"	6	6	Do. 6 p.c. Pref. ...	150–155	...	139–153
50,000	"	Dec. 17	3	3	Do. 3 p.c. Deb. ...	86–91*	...	79½–89½
262,025	"	"	4	4	Do. 4 p.c. Deb. ...	105–110*	...	103½–109½
335,000	"	"	5	5	Do. 5 p.c. Deb. ...	125–130*	...	122½–129
357,900	"	Aug. 13	7½	7½	Brighton, &c., 6 p.c. Con. ...	175–185	...	159½–185
540,000	"	"	6¼	6¼	Do. 5 p.c. Con. ...	158–163	...	151–161
195,500	"	"	6	6	Do. 6 p.c. B. Pref.	145–150	...	137½–144½
1,487,500	"	July 9	5	5	Bristol 5 p.c. max.	120–122a	...	‡
120,420	"	Dec. 17	4	4	Do. 1st 4 p.c. Deb. ...	102–104a*	...	‡
217,870	"	"	4	4	Do. 2nd 4 p.c. Deb. ...	102–104a*	...	‡
338,790	"	"	5	5	Do. 5 p.c. Deb.	122–124a	...	‡
885,000	"	Sept. 24	8	7	British Ord.	174–179	...	154–178½
100,000	"	Dec. 17	7	7	Do. 7 p.c. Pref.	155–160*	...	149–162½
120,000	"	"	4	4	Do. 4 p.c. Red. Deb. ...	97–102*	...	98½–101½
450,000	"	"	5	5	Do. 5 p.c. Red. Deb. ...	108–113*	...	109–112
100,000	10	22 May '33	6	4	Cape Town, Ltd.	2–4	...	3⅛–5⅛
100,000	10	Nov. 6	4½	4½	Do. 4½ p.c. Pref. ...	4–6	...	6⅛–7⅝
150,000	Stk.	Dec. 17	4½	4½	Do. 4½ p.c. Deb. ...	90–98*	...	90–99½
626,850	"	July 23	6	6	Cardiff Con. Ord.	135–140	...	126–136½
237,850	"	Dec 17	5	5	Do. 5 p.c. Red. Deb.	105–110*	...	...
157,150	"	July 23	5¼	5	Chester 5 p.c. Ord.	118–118b	...	120–125b
98,986	1	Sept. 24	2/-	2/-	Colombo, Ltd. Ord.	1⅞–1⅞	...	35/3–36/-
24,560	1	"	1/4½	1/4½	Do. 7 p.c. Pref. ...	19/6–21/6	...	19/9–20/9
609,304	1	Sept. 24	/11'48	/11'48	Colonial Gas Assn. Ltd. Ord.	19/6–21/6	...	20/–21/9
296,053	1	"	1/8'80	1/8'80	Do. 8 p.c. Pref.	24/6–26/6	...	24/–26/3
1,775,005	Stk.	July 23	6½	5	Commercial Ord.	122–127	...	120–127
475,000	"	Dec. 3	3	3	Do. 3 p.c. Deb. ...	87–91*	...	78–90
286,344	"	Aug. 13	5	5	Do. 5 p.c. Deb. ...	125–130	...	122–125½
807,560	"	Aug. 13	7	7	Croydon sliding scale ...	165–170	...	151–170
569,590	"	"	5	5	Do. max. div.	116–121	...	106½–120
620,345	"	Dec. 17	5	5	Do. 5 p.c. Deb.... ...	123–128*	...	121–127½
542,270	"	Aug. 13	10	7	Derby Con.	195–205e	...	‡
55,000	"	Dec. 17	4	4	Do. 4 p.c. Deb.	100–105e*	...	‡
209,000	"	Aug. 13	5	5	East Hull Ord. 5 p.c. ...	113–118	...	106–117½
181,625	"	Aug. 13	6	6	East Surrey Ord. 5 p.c. ...	140–145	...	128–141
175,609	"	Dec. 17	5	5	Do. 5 p.c. Deb. ...	123–128*	...	119–123½
1,002,180	"	Sept 10	†7	†5	European, Ltd.	130–125	...	120–134
19,343,763	"	Aug 13	5⅝	5⅝	Gas Light & Coke 4 p.c. Ord.	27/9–28/9f	...	25/–29/6
2,600,000	"	"	3½	3½	Do. 3½ p.c. max. ...	93–97	...	87–96½
4,477,106	"	"	4	4	Do. 4 p.c. Con. Pref. ...	109–113	...	103–111
6,102,497	"	Dec. 3	3	3	Do. 3 p.c. Con. Deb. ...	89 92	...	82½–92
2,642,770	"	"	5	5	Do. 5 p.c. Red. Deb. ..	118–121	...	115–121
2,500,000	"	"	4½	4½	Do. 4½ p.c. Red. Deb. ...	116–119	...	113–120
270,466	"	Aug. 13	6	6	Harrogate New Cons. ...	140–145	...	131–144½
140,000	1	Sept. 24	1/7½	1/7½	Hongkong & China, Ltd. ...	1⅛–1⅜	...	29/–30/9
218,200	Stk.	Aug. 13	6	6	Hornsey Con. 5½ p.c. ...	137–142	...	130–140½
5,600,000	"	Oct. 22	14	10	Imperial Continental Cap.	212–222	...	195–221½
223,180	"	July 23	3½	3½	Do. 3½ p.c. Red. Deb.	92–97	...	91–95
235,242	"	Aug. 13	8½	8½	Lea Bridge 5 p.c. Ord. ...	190–200	...	169–197
9,167,410	"	Aug. 13	6	6	Liverpool 5 p.c. Ord. ...	142½–144½b	...	130–143½b
245,500	"	Dec. 17	5	5	Do 5 p.c. Red. Pref. ...	105–110b*	...	106–106½b
306,083	"	July 16	4	4	Do. 4 p.c. Deb. ...	104–107b	...	102–104½b
11,751	"	Aug 27	10	8	Maidstone 5 p.c. Cap. ..	188–198	...	180
68,480	"	Dec. 17	3	3	Do. 3 p.c. Deb. ...	85–88*	...	78–75
75,000	"	Dec. 3	†10	†10	Malta & Mediterranean ...	200–210	...	207½–209
893,000	—	Oct. 1	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	100–103	...	102–103
231,978	Stk.	Aug. 13	5	5	M. S. Utility "C." Cons. ...	115–120	...	113½–118
818,557	"	"	4	4	Do. 4 p.c. Cons. Pref.	101–106	...	96–104½
360,075	"	Dec. 17	4	4	Do. 4 p.c. Deb. ...	02–107*	...	99–104½
148,955	"	"	5	†5	Do. 5 p.c. Deb. ...	125–130*	...	119–127½
125,000	—	July 2	...	11/8	Do 3½ p.c. Rd. Rg.Bds.	99–102	...	...
675,000	"	May 28	†6	†13	Montevideo, Ltd.	56–65	...	52½–65½
2,061,315	"	Aug. 13	5½	5	Newcastle & Gateshead Con.	26/6–27/-d/	...	‡
682,886	"	"	4	4	Do. 4 p.c. Pref. ...	105–107d	...	‡
776,706	"	Dec. 17	3½	3½	Do. 3½ p.c. Deb. ...	98½–100½d	...	‡
277,285	"	Oct. 8	5	5	Do. 5 p.c. Deb. '42 ...	105–107d	...	‡
274,000	"	Aug. 13	5	5	Newport (Mon.) 5 p.c. max.	110–112a	...	‡
204,940	"	Aug. 13	7½	7½	North Middlesex 6 p.c. Con.	170–175	...	156–175
396,160	"	Aug. 13	5	5	Northampton 5 p.c. max. ...	107–112	...	100–111
300,000	"	Nov. 5	†7	†9	Oriental, Ltd.	166–171	...	156–167
416,617	"	Dec. 17	8	8	Plym'th & Stonehouse 5 p.c.	180–185*	...	166–187
504,416	"	Aug. 13	8	8	Portsm'th Con.Stk. 4 p.c.Std	182–187	...	165–186½
241,446	"	"	5	5	Do. 5 p.c. max. ...	110–115	...	108 –112
114,000	"	July 23	5	5	Preston 5 p.c. Pref.	110–115	...	107–108
1,736,968	Stk.	Aug 27	6	6	Sheffield Cons.	147–149e	...	‡
95,000	"	July 9	4	4	Do. 4 p.c. Deb.	100–104e	...	‡
132,201	"	Aug 13	5	5½	Shrewsbury 5 p.c. Ord. ...	154–159	...	137–159½
90,000	10	May 28	14	13	South African	3–4	...	60/6–80/-
927,177	1	Sep. 10	1/2g	1/2g	South-East'n Gas Cn.Ld Ord	30/6–32/6	...	28/–32/3
796,061	1	"	-/10g	-/10g	Do. 4g p.c. Red.Cum.Pref	22/6–23/6	...	22/–23/6
450,000	Stk.	Aug. 13	74/1	4	Do. 4 p.c. Red. Deb. ...	102–105	...	102g–104½
6,719,895	"	Aug 13	7	5	South Met. Ord.	147–150	...	129–167½
1,135,812	"	"	6	6	Do. 6 p.c. Irred. Pf.	150–153	...	137½–153
850,000	"	"	4	4	Do. 4 p.c. Irred. Pf.	107–110	...	102–110
1,895,445	"	Dec. 17	3	3	Do. 3 p.c. Deb. ...	89–92*	...	80–93
1 000,000	"	July 9	5	5	Do. 5 p.c. Red. Deb.	117–121	...	113½–120½
209,820	"	Aug. 13	8½	8½	South Shields Con.	186–183d	-2	‡
1,543,795	"	July 9	6	6	South Suburban Ord. 5 p.c.	144–149	...	129–149
512,825	"	"	5	5	Do. 5 p.c. Pref.	124–129	...	116–127½
300,000	"	"	4	4	Do. 4 p.c. Pref.	105–110	...	101½–108
868,887	"	Dec. 17	5	5	Do. 5 p.c. Deb.	125–130*	...	121½–126½
100,000	"	"	4	4	Do. 4 p.c. Deb.	107–112*	...	104½–108½
647,740	"	Aug. 13	5	5	Southampt'n Ord. 5 p.c. max.	118–123	...	111–122½
121,275	"	Dec. 17	4	4	Do. 4 p.c. Deb.	102–107*	...	100–103
350,000	"	Aug. 13	5½	5½	Swansea 5½ p.c. Red. Pref.	114–119	...	108–118½
200,000	"	Dec. 17	6½	6½	Do. 6½ p.c. Red. Deb.	100–105*	...	103½–107
1,076,490	"	Aug. 13	6½	6½	Tottenham and District Ord.	163–168	...	150–166½
409,895	"	"	5½	5½	Do. 5½ p.c. Pref. ...	130–135	...	125–136
62,235	"	"	5	5	Do. 5 p.c. Pref. ...	122–127	...	118–124
199,005	"	Dec. 3	4	4	Do. 4 p.c. Deb. ...	102–107	...	100–103½
349,110	"	Aug. 13	7	7	Uxbridge, &c., 5 p.c. ...	165–170	...	150–170
88,330	"	"	5	5	Do. 5 p.c. Pref. ...	124–129	...	118½–117
1,326,700	"	Aug. 13	7	7	Wandsworth Consolidated	168–173	...	155–172
1,371,373	"	"	5	5	Do. 5 p.c. Pref.	126–131	...	119–131½
1,317,964	"	Dec. 17	5	5	Do. 5 p.c. Deb.	130–135*	...	121½–135
208,300	"	"	...	26/8	Do. 4 p.c. Deb.	104–109*	...	...
158,400	"	Aug. 13	6a	5	Winchester W.& G.5 p.c.Con.	120–125	...	117–119½

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. *g.*—Paid £8, including 10s. on account of back dividends. *h.*—Excluding special bargains. *i.*—Figures not available. * Ex. div. † Paid free of income-tax. ‡ For year.

COMPANY NOTICES.

THE GAS LIGHT AND COKE COMPANY.

NOTICE is Hereby Given that the TRANSFER BOOKS of this Company, so far as they relate to CAPITAL STOCKS, WILL BE CLOSED at Four o'clock p.m. on Tuesday, the 8th day of January next, and will be RE-OPENED immediately after the Ordinary General Meeting of the Company to be held on Friday, the 8th day of February next.

Dividends payable in respect of the Half-Year ending the 31st inst. will be remitted by Warrant forwarded by post on the 28th February, 1935, to those Proprietors who were the Holders of Capital Stocks when the Transfer Books were closed, or their Authorised Agents.

By order,
WILLIAM LYLE GALBRAITH,
Secretary.

Chief Office:
Horseferry Road,
Westminster, S.W. 1,
Dec. 27, 1934.

PLANT &c., FOR SALE & WANTED.

FOR SALE—Four Holmes's "Super" Type WATER TUBE CONDENSERS, approximately 30 ft. high, made up in 10 sections, each section 8 ft. 9 in. by 4 ft. 6 in. by 3 ft. Each chamber contains 26 cast iron tubes 3 in. in diameter; the total number of tubes = 230, which gives a cooling surface of 2,300 superficial feet. Each Condenser is capable of dealing with 625,000 cu.ft. of gas per day; complete with 16 in. Inlet, Outlet, and By-Pass Connections and Valves, and fitted with 3 in. Water Connections and Valves.

Four Holmes's Nine-Chamber ROTARY WASHER SCRUBBERS—brush type—7 ft. diameter. Two used at present for Ammonia Extraction and two for Benzole Recovery. Each Washer is complete with reduction gear (driving engine not included). Each is capable of dealing with 625,000 cu.ft. of gas per day. These are complete with 12 in. Inlet, Outlet, and By-Pass Connections and Valves.

Two Holmes's Double Unit Eight-Chamber ROTARY WASHER SCRUBBERS—brush type—with totally enclosed worm reduction gear in the centre. Each Machine capable of dealing with 625,000 cu.ft. of gas per day, and are complete with 12 in. Inlet, Outlet, and By-Pass Valves and Connections.

One Walker 3-Ton AMMONIACAL LIQUOR STILL, containing nine trays below the lime chamber, and six trays above for free ammonia.

Apply WM. KAYLEY, LTD., QUEEN STREET IRON WORKS, CHANCERY LANE, ARDWICK, MANCHESTER 12.

OXIDE

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THE BRITISH GAS PURIFYING MATERIALS CO., LTD.,
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Telegrams: "BRIPURIMAT, LEICESTER." Telephone: LEICESTER 59086.

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BRETTEL'S ESTATE
FIRE-CLAY & BRICK WORKS
STOURBRIDGE

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Special Lumps, Tiles, and Bricks for Regenerative and Furnace Work.
SHIPMENTS PROMPTLY AND CAREFULLY EXECUTED.

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REGULAR, RHYTHMIC FEET. Left! Left! Left, Right, Left! Your Feet are all RIGHT— none LEFT if you use A & M METERS — for when it comes to the measurement of CUBIC FEET OF GAS

A&M Meters always lead

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BRADFORD & BRANCHES